

THE DEBT CARRYING CAPACITY IN RELATION TO  
CASH INCOME OF NORTH CENTRAL KANSAS FARMS

by

WILFRED HAROLD PINE

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## INTRODUCTION

Credit has become an important part of the farm business. The farm mortgage debt in Kansas in 1935, as reported by the census, was \$328,478,000. This is an average farm mortgage debt of \$4,697 per farm for those farms having a mortgage debt, or 40.1 per cent of the total farms. Short-term debt and non-interest bearing debt would increase the total debt materially. However, from 1930 to 1935 the farm mortgage debt in Kansas decreased 16.3 per cent. Foreclosures, debt adjustments, and higher farm commodity prices have been factors tending to reduce the debt.

The pressing demand for suitable farm credit during the recent low commodity price period from 1931 to 1934 has led the Farm Credit Administration to loan a large sum of money to farmers. Delinquencies, increasing farm tenancy, governmental aid and other farm credit problems have led to a closer investigation of existing farm credit and its management in relation to the farm business.

One of the most vital credit problems is the amount of the loan. Obviously, it should bear some relation to the farm business. That relation usually has been expressed in per cent of the value of the assets for which

the loan was made. The assets may be used to satisfy the creditor in case the debtor is unable to fulfill his contract. Normally this is not contemplated by either the creditor or debtor. The debtor plans to satisfy the creditor by paying the interest and principal for which he has contracted. This he usually aims to do from the earnings of his business. Thus, the earning power of the business should be an important factor in determining the amount of the loan.

The value of the property may be considered as reflecting the earning power over a period of years. The value of the property usually is determined by the present earning power, the prospective earning power, and by such factors as location of the farm and desirability of the community. The imperfect vision of future earnings frequently has led to loans exceeding the ability of the farmers to pay the interest and principal.

Lenders and borrowers have been content in many cases to accept the market value of the property as a true reflection of the earnings. The market value is what other similar property in the community has been sold for recently or what actually would be paid for the property if sold. Except for the general influence over a long period of time, the market value of property is not always the result of

the earning power. A common fallacy has been to consider the market value of the property as the determinant of the earning power.

The earning power as is used here in determining the value of the property is the annual return from the investment. It is the income less the expenses except interest payments. If a certain rate of return is expected from the investment, the annual return should be the investment multiplied by the rate. Assuming that the annual return is known, the value of the investment at a certain rate can be determined by the capitalization process. If a property valued at \$10,000 earns 5 per cent, the annual interest or return would be \$500. Given the return and the interest rate, the value of the property is computed by the reverse of interest computation.

The creditor usually has accepted the market value of the property as reflecting the earnings, and he is safe, at least temporarily, if the market value equals or exceeds the value based on earnings. If the debt exceeds the value based on the earning power of the property, eventually the market value will decline to a point equal to or even less than the debt. In this event the borrower is unable to pay and the creditor has a loan which is for more than the present market value. The farmer cannot go

on piling up debt against an inadequate income.

Obviously, the debt that can be carried depends upon the rate of interest paid and the margin of the income left after paying all expenses except those on the debt. Where complete farm records have been kept, the margin can be determined readily. In other cases the gross income can be estimated fairly well. The farmer knows about what crops and livestock he has sold or will sell and how many dollars he has or will receive. He can give a reasonable estimate of miscellaneous incomes. On the other hand, it is difficult on many farms to determine the expenditures. There are many more items of expenditure than income. Some can be allocated entirely to the year in consideration and other expenses are made for a period of years. It would be practical if the debt could be related to the total income and if the usual ratio of a capacity debt to the total income were known. This can be done by the analysis of farm records to find what margin of income was available for debt, how much debt this margin would carry at various rates of interest, and the relation of this debt to the total income. To the extent that future incomes and margins can be estimated, the ratio of the capacity debt to the income would be helpful to both the creditor and the borrower in determining the amount of the loan. For the

farm business the ratio would vary for different types of tenure and for different types of farming.

It is the purpose of this study to determine the ratio of debt to income beyond which the farmer's chance of paying the debt, without sacrifice of his property, becomes small.

#### REVIEW OF LITERATURE

Studies relative to the debt carrying capacity of farmers have dealt primarily with the relation of the amount of a loan to the value of the assets. Income as a determinant of a loan has been used by many lending agencies as a measure of the value of the assets. In most cases the net income available for debt is capitalized at a going rate of interest to help determine the value of the asset. With a few exceptions previous studies have not related the amount of debt directly to the income. A review of a few of the more important works in which income was a factor in determining the value, hence the amount of a loan, will be given as well as those studies which more directly relate debt to income.

Doane (1) says that American rural appraisers have no generally accepted appraisal system. Methods used by rural

appraisers have not been based upon a theory of appraisal. This has caused many smash-ups in the farm mortgage field. Doane, in reporting for the National Joint Committee on Rural Credit, a joint committee appointed in 1932 by the American Farm Economic Association and other associations, states that "A rural appraisal is the definite, written, detailed opinion of an individual or group of individuals of the basic value of a rural property." The basic value was defined as "the worth of a property derived from such economic elements as earnings, location, and home use." Of these the earnings rank first in importance. Many authorities on land values accept the "income theory". Doane illustrates this theory by calculating the expected income from a farm. He assumes typical conditions as to the kind and number of enterprises, production, prices, landlord's share, and landlord's expenses. Then, by capitalizing the landlord's net income at a 5 per cent rate he determines the value of the property. Both the difficulty of selecting a rate of interest and the uncertainty of the future annual incomes are recognized. Following Doane's procedure, the value obtained should indicate the maximum loan that can be carried if no principal payments are made and the interest rate on the loan is the same as the rate of capitalization. In theory, the debt carrying

capacity can be determined in this way.

Galbraith, Macy, and Malenbaum (2) in outlining the possible ways of repayment of a loan included the payment of principal, or interest and principal, subject to compulsory adjustment on the basis of ability to pay. The ability to pay varies according to increases or decreases in farm income. These men recognize the possible improvement by the use of this method in contrast with fixed principal payments which disregards the farm income in any year or period of years. The ability to pay would then determine repayment and, indirectly, the amount of the loan. Although not emphasized by these men, if a loan is expected to be repaid within a definite period of time the earnings must be sufficient over the period regardless of the amount paid each year.

In an unpublished study of the farm credit situation in Kansas, Kreek (3) found that the common practice of insurance and mortgage companies was to lend 40 to 50 per cent of the valuation of the land. Only in a few cases did they lend on building values. The methods of determining the value of the land were not included. Five years was the usual term for the loans. In 1935 the majority favored the annual reduction plan of repayment. Interest rates of 5 to  $5\frac{1}{2}$  per cent and commission charges, representing



service costs, of about 1 per cent were most common. From these findings it seems that little regard had been given to ability to pay in determining the amount of the loan or the repayment of the loan. Kreek includes as a fundamental principle for satisfactory credit facilities, the loan should be for a productive purpose so that the returns would repay the loan, interest, other costs, and leave a profit for the borrower. A second principle is that the term of the loan should conform to the productive life of the proposed investment. And third, payment of interest and principal should be at a time when it is convenient to pay. These three principles are based essentially upon the earning power of the property for which the loan is made.

The Farm Credit Administration has issued several publications in the field of farm credit. Circular Number 13 (4) discusses appraising farms for mortgage loans. The appraisals are made by a public official appointed by the Land Bank Commissioner. The appraised value of the farm for loan purposes is given by the appraiser in his report. Also the appraiser recommends the amount of the loan. The basis of appraisal, as prescribed by the laws under which the Federal Land Banks operate is the value of the land for agricultural purposes.



The earning power of the land is the principal factor determining the value. Other factors influence the value such as location, desirability as a home, and hazards. The problem is not simply the capitalization of net returns. The appraiser attempts to find what the typical farmer in the area would pay for the farm under normal prices for farm products. To answer this question the appraiser considers the normal use of the land and the average earnings which may be expected. The desirability of such an investment as compared with other investments helps determine the rate of earnings which may be expected. The manager and other valuation factors of the farm in question are compared with the average in the area. The net earnings are determined either by the net income to the landlord or if an owner-operated farm the net income after paying the operating expenses, a fair allowance for living expenses, and a fair return for management. A capitalization rate which seems fair for the conditions is applied to the net earnings to determine the value of the land. The value of the buildings is added to the land value for a complete valuation. Federal Land Bank loans are made up to 50 per cent of the value of the land and 20 per cent of the value of the buildings. The Emergency Farm Mortgage Act of 1933 provided for an additional Land Bank Commissioner's loan

of 25 per cent of the value of the land and buildings to be available until February, 1940. Interest rates were reduced in the same act to  $3\frac{1}{2}$  per cent to be in effect up to July 1, 1938. The usual rate on existing loans is 4 to 6 per cent.

The Farm Credit Administration does not directly relate the amount of the loan with the income. However, income is the important valuation factor.

In the May and June 1937 issue of the Illinois Farm Economics, Norton and Sayre (5) gave a brief report of a credit study of farms in Illinois. The department of Agricultural Economics at the University of Illinois has a manuscript prepared of this study. It is not available at present. Norton and Sayre say that "any sound borrowing must be based on capacity to pay." A loan based upon property with an insufficient earning power will become frozen. Information from 1055 farmers relative to the debts they owed was secured for 1935. The ratio between the debt and the value of the property as secured from their farm records was determined for each operator. For owned farms long-term debt was slightly over one-fourth of the value of land and buildings. Short-term debt was about one-fifth of the working capital. As the debt in relation to the value of the property increased up to 50 per cent the total value of property increased. Beyond this point the total value

of property decreased. This indicates that up to a certain point farmers have been able to expand the scope of their operations by borrowing.

Little relationship between debt and income was found by Norton and Sayre. Net cash income after paying interest was about \$100 a month on the highest indebted farms. The debt-paying capacity of these farms is low after allowing for living expenses.

For tenant-operated farms the cash income was highest for the debt-free farms. The net cash income before paying interest on the heaviest indebted farms was higher than for farms with less debt. The pressure of fixed charges may have caused a more cautious policy to be followed by the heaviest indebted farmers. Of the farms with debt, the net cash income after paying interest was below the assumed cash living expenses of \$1,000. The debt-free tenants showed as large a net cash income as the debt-free owners in spite of the fact they had \$21,000 less property.

By estimating from the data furnished by Norton and Sayre there would be little chance for a farmer on an owned farm to repay the debt when it exceeded the annual income by approximately five times. From this point on the interest on the debt would be greater than the difference between the income and the farm expenses other than

the interest. Tenant farmers would have little chance of repaying the debt when the debt exceeded the annual income from the farm.

Green (6), in an unpublished paper, related debt to income by the use of debt, income, and expense data primarily for the United States, for geographic divisions, and for each state. He found the farm mortgage debt to be 2.8 times the annual cash income in the United States in 1936. Since only part of the farms are mortgaged, the cash income was adjusted proportionately. For instance, 34.5 per cent of all farms in 1935 were mortgaged. In 1933 the debt was 4.5 times the income. From 1925 to 1930 the ratio varied from 2.6 to 2.8. Theoretically the debt carrying capacity is the margin of income left after paying farm and living expenses divided by the rate of interest or the debt service. Since 1922, margins varied from 2.5 in 1932 to 22.0 in 1925 and 1928. Green assumed a debt service of 6 per cent which would give a debt limit ratio of 3.7 for any year. In 1934 the actual ratio was 3.5 while the capacity ratio for all farms at 6 per cent service was 3.3. In 1935 Kansas mortgaged farms had a ratio of debt to income of 3.0.

Green found that the operating ratios, expenses in per cent of income, varied geographically. The variation was

greatest in the three years 1930, 1931, and 1932. For individual farms there was a tendency toward a modal range of 60 to 69 and 70 to 79 in the operating ratios excluding living expenses.

In 1935 there was a variation in the ratio of debt to income among the states from 1.6 in New Jersey, North Carolina, and Louisiana to 5.0 in South Dakota. The ratios of debt to income varied widely among farms. The greatest concentration of debt is in the West North Central States. In 1935, 17.3 per cent of the farms in the United States carried 35 per cent of the total mortgage debt of the United States. Green states that the government in Hungary was taking over the debt in excess of a certain ratio of debt to income in certain areas in Hungary where debt had concentrated. From Canadian data it was found that certain areas were carrying an excessively high debt in relation to income. Other areas were not in such financial distress. These latter areas had a debt ratio of slightly more than 3.0 for owned farms and a debt ratio of less than 1.0 for rented farms.

## SCOPE OF STUDY

There are three Farm Bureau Farm and Home Management Associations in Kansas. Each association is an organization of more than 100 farmers who secure management service for the farm and home from a fieldman. This fieldman acts in about the same capacity as a county agricultural agent, but gives his full time to the members of the association. Most of the members of the association carefully keep a farm record. The fieldman usually makes five visits to each farm each year at which times he checks over the farm record book. The majority of the records are in sufficient detail to provide for a rather complete analysis of the farm business. A separate record of family living expenses is kept on approximately one-half of the farms.

One association is located in east north central Kansas, another in east south central Kansas, and the third in west south central Kansas. The first two were organized in 1931 and the third in 1937. The farms of the association in east north central Kansas have been used for this study. Figure 1 shows the location of the counties in which the farms are located. This association is commonly known as the Northern Association and hereafter will be referred

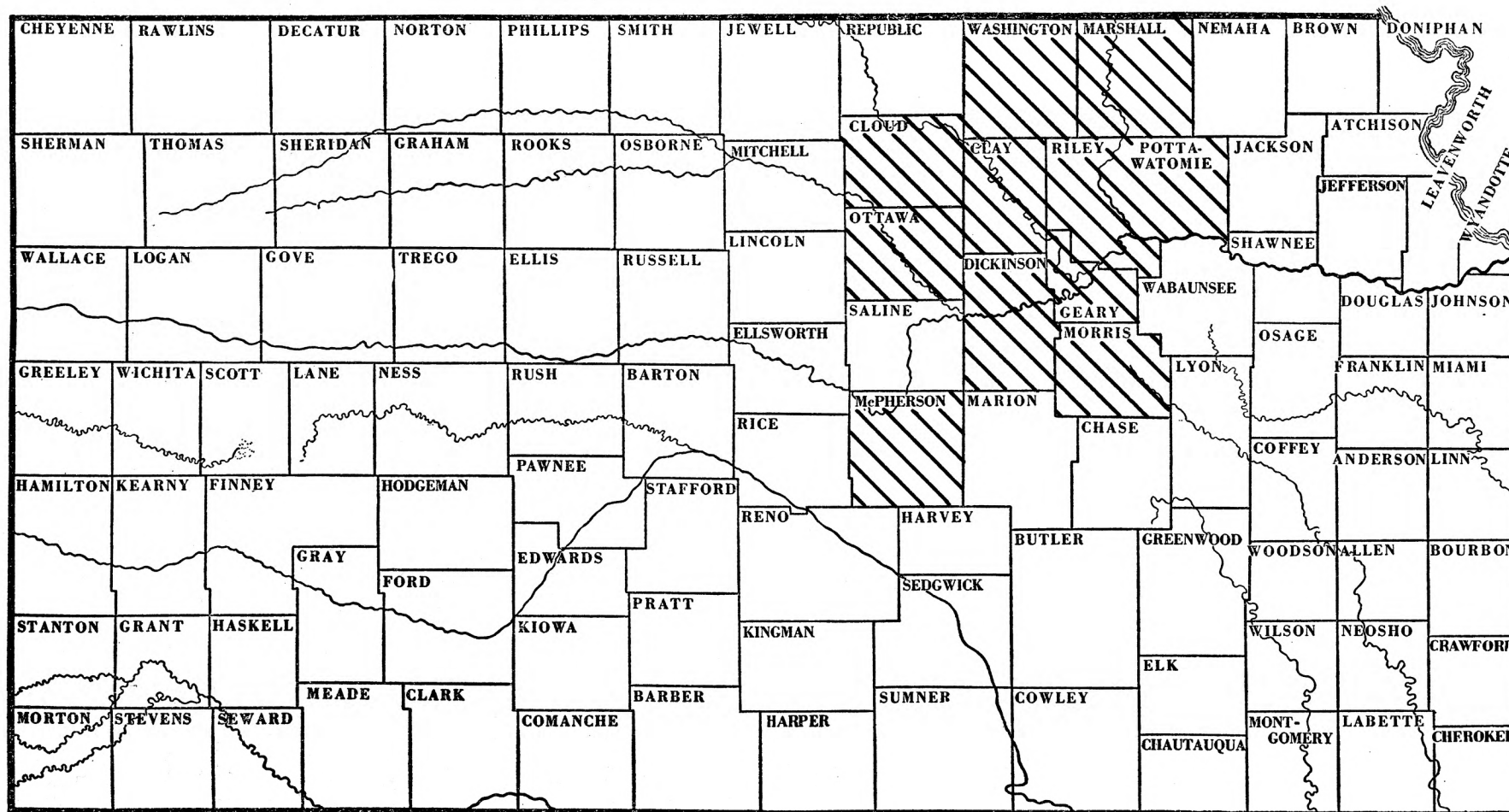


Fig. 1. Hachured area shows the counties in Kansas in which the farms of the Northern Farm Bureau Farm and Home Management Association are located.



to as such. A large proportion of the Northern Association farms are in type-of-farming area 6a of Kansas. This area includes Clay, Cloud, Dickinson, Ottawa, Saline, and Marion counties. Cash-grain, livestock, and general farming characterize this area. Corn and hogs are important in the northern part of the association area while in the southwestern part, wheat is more important. The southeastern part extends into the Blue Stem grazing area of Kansas.

Farm records are available for these farms from 1931 to 1936, inclusive. After discarding those farm records insufficiently complete for analysis, there were 642 records for the six years. Table I shows the number of farm records by county for each year. The receipts and expenses were complete on these records. The number increased from 93 in 1931 to 125 in 1934 and decreased to 100 in 1936. Each year there were new farms added to the association and each year some discontinued membership. Twenty-five members kept records throughout the period. Two hundred eighty one of the 642 records furnished an adequate debt record which could be used in this study. A record was considered adequate if the interest paid was within 3.5 to 8.0 per cent of the debt. A complete debt record is one of the most difficult parts to secure in a farm record. For personal reasons, primarily, farmers, like many other people, are



Table I. Number and Location of Farms in the Northern Association in Kansas, 1931 to 1936.<sup>1</sup>

| County       | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | Total |
|--------------|------|------|------|------|------|------|-------|
| Dickinson    |      | 9    | 11   | 14   | 16   | 18   | 68    |
| Marshall     |      | 7    | 10   | 17   | 12   | 11   | 57    |
| McPherson    |      |      | 1    | 1    |      |      | 2     |
| Riley        | 20   | 18   | 23   | 25   | 25   | 19   | 130   |
| Cloud        | 18   | 13   | 13   | 11   | 13   | 8    | 76    |
| Washington   | 20   | 18   | 21   | 20   | 14   | 10   | 103   |
| Pottawatomie |      |      |      |      |      | 1    | 1     |
| Clay         | 13   | 14   | 20   | 25   | 23   | 22   | 115   |
| Geary        | 12   | 8    | 5    | 4    | 2    | 3    | 34    |
| Morris       |      | 3    | 4    | 3    | 3    | 2    | 15    |
| Ottawa       | 10   | 7    | 7    | 5    | 4    | 6    | 39    |
| Total        | 93   | 97   | 115  | 125  | 112  | 100  | 642   |

<sup>1</sup>Farms with incomplete records are not included.

reluctant toward revealing their financial indebtedness and refuse to do so in many instances.

#### PROCEDURE OF STUDY

A descriptive analysis and a comparison of the farms studied with other farms are essential in determining the applicability of the results and conclusions of the study. The association farms were classified according to tenure and type of farming for each year. The farms in the association and all farms in the association area were grouped according to farm acreage in 1935. A comparison was made of the association farms with those in the area classified according to tenure in 1935. Likewise, the classifications by type of farming were compared. To compare the income of the association farms with other farms the incomes for 1932 and succeeding years were expressed in per cent of the income in 1931. The income in Kansas was used for this comparison. The per cent of the hogs marketed during the high months of the year was compared with hog marketings of all Kansas farmers during the same months. Other minor comparisons were made.

The applicability of the results of the study to any period of years requires a study of the period of years in

which the records were kept. The farm production in the area in which the farms are located and the prices received and paid by farmers were studied by years since 1910. These factors are of prime importance in influencing the debt carrying capacity. The production of corn and wheat in bushels and numbers of the principal kinds of livestock in type-of-farming area 6a of Kansas were used to represent the association area. These data were secured from reports of the Kansas State Board of Agriculture. Prices received and paid were index figures for the United States, 1910 to 1914 used as a base, as reported in "The Agricultural Situation", published by the Bureau of Agricultural Economics, United States Department of Agriculture (7).

The study of the debt carrying capacity was divided into two phases. The first consisted of an analysis of income and expenses to find what was left for carrying debt. The second phase consisted of an analysis of the debt carried and the net cash income after paying interest.

By capitalization of the margin of income remaining for debt at the rate of interest being paid on loans, the size of debt that could be carried is secured. This allows for no payment on the principal. By adding a rate of repayment to the interest, the maximum debt load for payment of both interest and principal is determined. The maximum

debt in relation to income then can be expressed in terms of a ratio. For instance, if the expenses excluding interest and principal paid consumed 85 per cent of the income of the farm, the remaining 15 per cent would carry a debt three times the income with an interest or debt service of 5 per cent. For every \$100 in income, \$15 is available for the debt service. A debt of \$100 would take \$5 for the debt service. The \$15 would carry three times the \$100 or \$300. A good debt policy should allow for the amortization of the loan. For this study only interest has been allowed in determining the maximum debt that can be carried. The cash income and expenses were used in this study. It is net cash available that is used to pay interest and principal of a debt. An increase one year in the inventory, that is expected to be a part of income, should appear as cash income in subsequent years. A cash expense for a capital item such as a building may come in one year, whereas the building may be useful for 40 years and depreciate a little each year. Eventually another outlay will be necessary. Averaging one year with such an expense with 39 other years would distribute the expense. Over a period of years the cash basis will show approximately the same available cash as the accrual basis which allows for such items as depreciation and inventory changes. The accrual basis

permits the variable factor of the operator's judgment of inventory values and depreciation to influence the income. Frequently, this has been called "paper income." The cash basis actually shows the income and expenses.

There was little difficulty encountered in securing the cash income or cash farm expenses from the records. The cash income consisted of all sales and receipts from any source. It includes all cash received by the farmer except from borrowing and hereafter, income will be defined as such. The cash farm expenses included all operating expenses and purchases and repairs of capital items, except land or farms purchased. Interest and principal payments were not included in the expenses. A cash allowance for family living expenses was made in determining the operating ratio. The operating ratio is all the expenses, farm and living, in per cent of the income.

Summaries of the home account books kept for the homes of part of the farms were available.<sup>1</sup> The cash family expenses of the association farms were available for 77 farms in 1934, 97 in 1935, and 66 in 1936. Various methods were used to estimate the cash living expenses for

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<sup>1</sup>The home account books were summarized by Myrtle A. Gunselman, Department of Home Economics, Kansas Agricultural Experiment Station, to show the cash expenses.

the other farms. The farm account book has a column for the living expenses. In some cases these had been kept for the full year. In other cases they were kept for part of the year. In these latter cases, adjustments to a 12-month basis were made, usually by allowing a larger proportion than one-twelfth of the year for December as was shown to be the usual case from studies of the full-year records. There were a few farms with no living expense record of any kind.

Kirkpatrick and Sanders (8) gave as two of the important factors affecting the living expenses of farm families the net worth and the annual accumulation or income. Of these two factors the net worth is more important. The net worth of the farms with home account records for 1934, 1935, and 1936 were plotted with the cash living expenses. This was done for the farms by tenure. Net cash income and cash living expenses were plotted also. The residuals from the regression line secured from the net worth and cash living expenses were plotted in some cases with the net cash income. Where this accounted for part of the difference, the cash living expenses were estimated by this method for the farms. In other cases the best regression line was used for the estimation. For 1931, 1932, and 1933 the same procedure was followed, using the cash living expenses as

reported in the farm account book.

The farm and living expenses each in per cent of the income were calculated for each farm and for the average of the farms grouped by tenure--owned farms, part-owned farms, and rented farms—for each year and for the six years. The farm expenses, living expenses, and the two together, the operating ratio, were grouped into frequency distributions. The ranges of the modal group for each tenure group and for each year were secured. The variations in the farm and living expenses in per cent of income and the operating ratios were calculated and expressed by the coefficient of variation.

The farms were reclassified according to type of farming and the same procedure of study was followed as was used for the farms classified by tenure. To determine the type of farming followed by each farmer, Elliott's method was used (9), except that the gross receipts were the basis of determination in this study while Elliott used the sales from each enterprise in per cent of the total sales with 40 per cent the minimum for a commodity type. Gross receipts include sales, inventory change, and the value of the farm products used in the home. This method clearly reflects the type for any one year. Elliott had only sales available to use as a basis. The method used is more satisfactory



for other studies expected to be made by type of farming. The types of farming were: dairy, poultry, cash-grain, livestock specialty, and general. Since a large proportion of the farms were general, these farms were sub-classed according to the principal enterprise. The livestock specialty farms were divided into beef and hog farms. To have a number of farms sufficiently large for statistical procedure and for the conclusions to be consistent and reliable, the general farms were distributed to the commodity types so that the dairy farms and general dairy farms were together and likewise for poultry, cash-grain, beef, and hog farms.

The second part of the study consisted of a determination of the ratio of interest bearing debt carried to the income. This ratio was then compared with the net cash income after paying interest. The farms were arrayed for each year according to the ratio of debt to income with the expectation that the net income after paying interest would decline as the ratio went higher. The array for each year was divided into nine groups and the totals for each group were determined. The totals of corresponding groups for the six years were totaled and averaged. These averages were plotted with the average net cash income after paying interest for the same farms. The regression line was



calculated and the point at which it crossed the zero net cash income after paying interest was determined. A frequency distribution of the net number of plus net cash incomes after paying interest was prepared according to the ratio of debt to income.

It was necessary to select those farm records which gave a satisfactory debt report. Many of the records failed to give the amount of debt carried and in some cases there appeared to be no relationship between the size of the debt and the interest paid. No interest was paid in some years and in other years the interest item appeared to include more than one year's interest. There was an insufficient number of farms with six years of consecutive records, which showed an average amount of interest paid for six years within a reasonably expected rate of interest to use for the study. It was necessary to select for each year those records with a satisfactory debt report. Those farm records showing an interest payment within a rate from 3.5 per cent to 8.0 per cent and those with no debt and paying no interest were used. The lower limit was based on the fact that the interest rate of the Federal Land Bank, and of some other agencies, was 3.5 per cent during the last half of the period. Many farms did not pay as much as 3.5 per cent. Many of these were considered abnormal. In

some cases, adjustments or releases from interest were granted by the lender. For the upper limit, 8 per cent interest was paid in many cases on chattel mortgages and short-term debts. There were few farms paying more than 8 per cent interest.

There were 281 records used in this part of the study. The number of records used ranged from 40 in 1931 to 55 in 1934. The farms were not classified by tenure or type of farming for this part of the study. Debt is only one factor affecting net cash income. A few farms would not be expected to show a relationship from which a dependable conclusion may be drawn. Because the debt ratio when net cash income after paying interest would become zero or less would vary from year to year, it did not seem justifiable to combine the years for tenure. Division on the basis of tenure seems important if the records would justify it.

#### GENERAL DESCRIPTION OF THE FARMS

A description of the farms included in the study and a comparison of them with other farms is essential in determining the general applicability of the results of this study. For the six years, owner-operated farms included 253, or 39.4 per cent, of the 642 farm records. Part-owned

farms were 34.5 per cent of the total farms and rented farms were 26.1 per cent of the farms. Table II shows the distribution for each of the six years. The per cent of the farms rented increased throughout the period. Ownership declined in 1934 and 1935, but in 1936 returned to about the original level. Part-owned farms were a smaller proportion of the total in 1933 and 1936 or about 10 per cent below the other years.

The distribution of the farms in the association according to type of farming is shown in Table III. The commodity type of farming and the general farm with the same major enterprise were put into one group, such as the dairy farms and general dairy farms. For the six years more than one-fourth of the farms were cash-grain farms. Dairy, hog, and beef farms each comprised about one-fifth of the total and poultry farms 11.8 per cent or about one-eighth of the total farms. There was considerable variation in the importance of some types from year to year. Border-line farms would account for part of the change. An uneven change in prices and in production would cause changes in classification where the actual farm organization had not changed. The turnover in the association membership is another factor changing the proportion in each type. There was a slight decline in the proportion of dairy farms

Table II. Distribution of the Farms in the Northern Association by Tenure, 1931 to 1936.

| Tenure            | 1931  | 1932  | 1933  | 1934  | 1935  | 1936  | Total |
|-------------------|-------|-------|-------|-------|-------|-------|-------|
| Number of Farms   |       |       |       |       |       |       |       |
| Owned             | 42    | 38    | 48    | 44    | 40    | 41    | 253   |
| Part-owned        | 33    | 38    | 34    | 46    | 42    | 28    | 221   |
| Rented            | 18    | 21    | 33    | 35    | 30    | 31    | 168   |
| Total             | 93    | 97    | 115   | 125   | 112   | 100   | 642   |
| Per Cent of Farms |       |       |       |       |       |       |       |
| Owned             | 45.2  | 39.2  | 41.7  | 35.2  | 35.7  | 41.0  | 39.4  |
| Part-owned        | 35.5  | 39.2  | 29.6  | 36.8  | 37.5  | 28.0  | 34.5  |
| Rented            | 19.3  | 21.6  | 28.7  | 28.0  | 26.8  | 31.0  | 26.1  |
| Total             | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Table III. Distribution of the Farms in the Northern Association by Type of Farming, 1931 to 1936.

| Type of Farming                              | 1931  | 1932  | 1933  | 1934  | 1935  | 1936  | Total |
|--|-------|-------|-------|-------|-------|-------|-------|
| Number of Farms                              |       |       |       |       |       |       |       |
| Dairy and General Dairy                      | 25    | 30    | 22    | 24    | 25    | 14    | 140   |
| Poultry and General Poultry                  | 12    | 13    | 6     | 17    | 17    | 11    | 76    |
| Cash Grain and General Crop                  | 14    | 13    | 39    | 41    | 24    | 42    | 173   |
| Livestock Specialty Beef<br>and General Beef | 19    | 21    | 29    | 22    | 24    | 10    | 125   |
| Livestock Specialty Hog<br>and General Hog   | 23    | 20    | 19    | 21    | 22    | 23    | 128   |
| Total  | 93    | 97    | 115   | 125   | 112   | 100   | 642   |
| Per Cent of Farms                            |       |       |       |       |       |       |       |
| Dairy and General Dairy                      | 26.9  | 30.9  | 19.1  | 19.2  | 22.4  | 14.0  | 21.8  |
| Poultry and General Poultry                  | 12.9  | 13.4  | 5.2   | 13.6  | 15.2  | 11.0  | 11.8  |
| Cash Grain and General Crop                  | 15.1  | 13.4  | 33.9  | 32.8  | 21.4  | 42.0  | 26.9  |
| Livestock Specialty Beef<br>and General Beef | 20.4  | 21.7  | 25.3  | 17.6  | 21.4  | 10.0  | 19.5  |
| Livestock Specialty Hog<br>and General Hog   | 24.7  | 20.6  | 16.5  | 16.8  | 19.6  | 23.0  | 20.0  |
| Total  | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

during the six years. The proportion in cash-grain farms varied from 13.4 per cent in 1932 to 42.0 per cent in 1936. The hog farms varied least in the proportion during the six years.

Table IV shows a frequency distribution of the farms in 1935 in the Northern Association and for the farms in the nine principal counties (since there was only one farm in McPherson in 1933 and 1934 and one in Pottawatomie in 1936, these two counties were not included) in which the association farms are located according to the acres in the farm. The farms of the association are larger than other farms in the area. The range in acres for the modal group of the association farms was 260 to 499, which included 36.6 per cent of the farms. The size group of 175 to 259 acres was a close second, consisting of 32.1 per cent of the farms. There were no farms in the group of less than 100 acres. The modal size group for all farms in the area was from 100 to 174 acres and included 30.4 per cent of the farms. More than one-fifth of the farms in the area have 100 acres or less. Approximately 5 per cent of the farms in the area have 500 acres or more. There was 16.1 per cent of the association farms with 500 acres or more.

The 1935 census reported 37.2 per cent of the farms in the association area as operated by owners, as is shown

Table IV. Distribution of Farms in the Counties<sup>1</sup> in which the Farms of the Northern Association are Located and of the Association Farms According to Acres in Farms in 1935.

| Size Group<br>(acres) | Number of Farms |             | Per cent of Farms |             |
|-----------------------|-----------------|-------------|-------------------|-------------|
|                       | Census          | Association | Census            | Association |
| Less than 100         | 4,172           | 0           | 22.9              | 0           |
| 100 to 174            | 5,538           | 17          | 30.4              | 15.2        |
| 175 to 259            | 3,800           | 36          | 20.8              | 32.1        |
| 260 to 499            | 3,820           | 41          | 21.0              | 36.6        |
| 500 to 999            | 752             | 17          | 4.1               | 15.2        |
| 1000 and more         | 142             | 1           | 0.8               | 0.9         |
| Total                 | 18,224          | 112         | 100.0             | 100.0       |

<sup>1</sup>McPherson and Pottawatomie Counties not included.

in Table V. A slightly smaller per cent of the association farms were owner-operated. A large proportion, 44.0 per cent, of the farms in the area were rented while 26.8 per cent of the association farms were rented farms. This difference is offset by the large proportion of the association farms part-owned, 37.5 per cent, in contrast with 18.5 per cent of all farms in the area.

A comparison of the farms in the association and in the area according to type of farming was more difficult. A classification of all farms by type of farming is available only for the 1930 census as determined by Elliott. The number of association farms in each type for the six years is compared with the census. This comparison is shown in Table VI. Dairy farms predominated to a greater extent in the association, consisting of 11.5 per cent of the farms, while for the area 2.7 per cent. The association had 11.7 per cent cash-grain farms in contrast with 29.9 per cent for the area. A large proportion of the association farms were classed as general farms, 40.5 per cent, while the area had 28.0 per cent general farms. The area had 8.7 per cent of the farms in types not represented in the association. With a large proportion of the association farms dairy, poultry, and general farms one may consider the association farms generally more conservative.



Table V. Distribution of the Farms in the Counties<sup>1</sup> in which the Farms of the Northern Association are Located and of the Association Farms according to Tenure in 1935.

| Tenure          | Number of Farms |             | Per cent of Farms |             |
|-----------------|-----------------|-------------|-------------------|-------------|
|                 | Census          | Association | Census            | Association |
| Owned           | 6,778           | 40          | 37.2              | 35.7        |
| Part-owned      | 3,365           | 42          | 18.5              | 37.5        |
| Manager         | 58              | 0           | .3                | 0           |
| Rented (Tenant) | 8,023           | 30          | 44.0              | 26.8        |
| Total           | 18,224          | 112         | 100.0             | 100.0       |

<sup>1</sup>McPherson and Pottawatomie Counties not included.

Table VI. Distribution of Farms in Counties<sup>1</sup> in which the Farms of the Northern Association are Located and of the Association Farms According to Type of Farming.

| Type of Farming     | Number of Farms |                       | Per cent of Farms |                       |
|---------------------|-----------------|-----------------------|-------------------|-----------------------|
|                     | 1930 Census     | Six years Association | 1930 Census       | Six years Association |
| Dairy               | 473             | 74                    | 2.7               | 11.5                  |
| Poultry             | 757             | 36                    | 4.3               | 5.6                   |
| Cash Grain          | 5,300           | 75                    | 29.9              | 11.7                  |
| Livestock Specialty | 4,682           | 198                   | 26.4              | 30.7                  |
| General             | 4,955           | 259                   | 28.0              | 40.5                  |
| Other               | 1,545           | 0                     | 8.7               | 0.0                   |
| Total               | 17,712          | 642                   | 100.0             | 100.0                 |

<sup>1</sup>McPherson and Pottawatomie Counties not included.

Income is the principal factor determining the debt carrying capacity. A comparison is shown in Table VII and figure 2 of the average cash income for the association farms and cash income from farm marketing in Kansas. The incomes for years subsequent to 1931 were expressed in per cent of 1931 so that the change for the two would be comparable. The income for the average association farm and for farm income in Kansas declined relatively the same amount in 1932. The income for the average association farm declined further in 1933 while for Kansas a slight gain was shown. Following 1933 the association income advanced more rapidly than the farm income in Kansas. The average farm expense for the association farms is shown in the same table and on the same chart. Farm expenses were not available for Kansas. The association farm expenses decreased with income in 1932, and remained the same in 1933. Expenses did not advance as rapidly in 1934 as income, but more rapidly in 1935 and 1936.

Marketing of hogs in the seasonally high months of the year is a measure of a desirable farm practice used by farmers. Table VIII shows that the association farmers marketed a much larger proportion of their hogs during the seasonally high months of March, July, August, and September than for all farmers in Kansas. Conversely, they

Table VII. Average Cash Farm Income and Expenses of the Northern Association and Cash Income from Farm Marketing in Kansas<sup>1</sup> 1931 to 1936.

| Year | Cash Farm<br>income<br>Northern<br>Association | Cash Farm<br>income in<br>Kansas<br>(1,000) | Cash Farm<br>Expenses<br>Northern<br>Association | 1931 = 100                        |                  |                                     |
|------|--|---|--|-----------------------------------|------------------|-------------------------------------|
|      |  |   |  | Northern<br>Association<br>income | Kansas<br>income | Northern<br>Association<br>expenses |
| 1931 | 3,350  | 230,430                                     | 2,898  | 100.0                             | 100.0            | 100.0                               |
| 1932 | 2,451  | 167,060                                     | 2,154  | 73.2                              | 72.5             | 74.4                                |
| 1933 | 2,323  | 175,863                                     | 2,160  | 69.4                              | 76.3             | 74.6                                |
| 1934 | 3,459  | 249,455                                     | 2,883  | 103.3                             | 108.3            | 99.5                                |
| 1935 | 4,345  | 274,550                                     | 3,981  | 129.8                             | 119.1            | 137.4                               |
| 1936 | 4,630  | 298,806                                     | 4,363  | 138.2                             | 129.7            | 150.6                               |

<sup>1</sup>Farm Income Reports of Bureau of Agricultural Economics and United States Department of Agriculture.

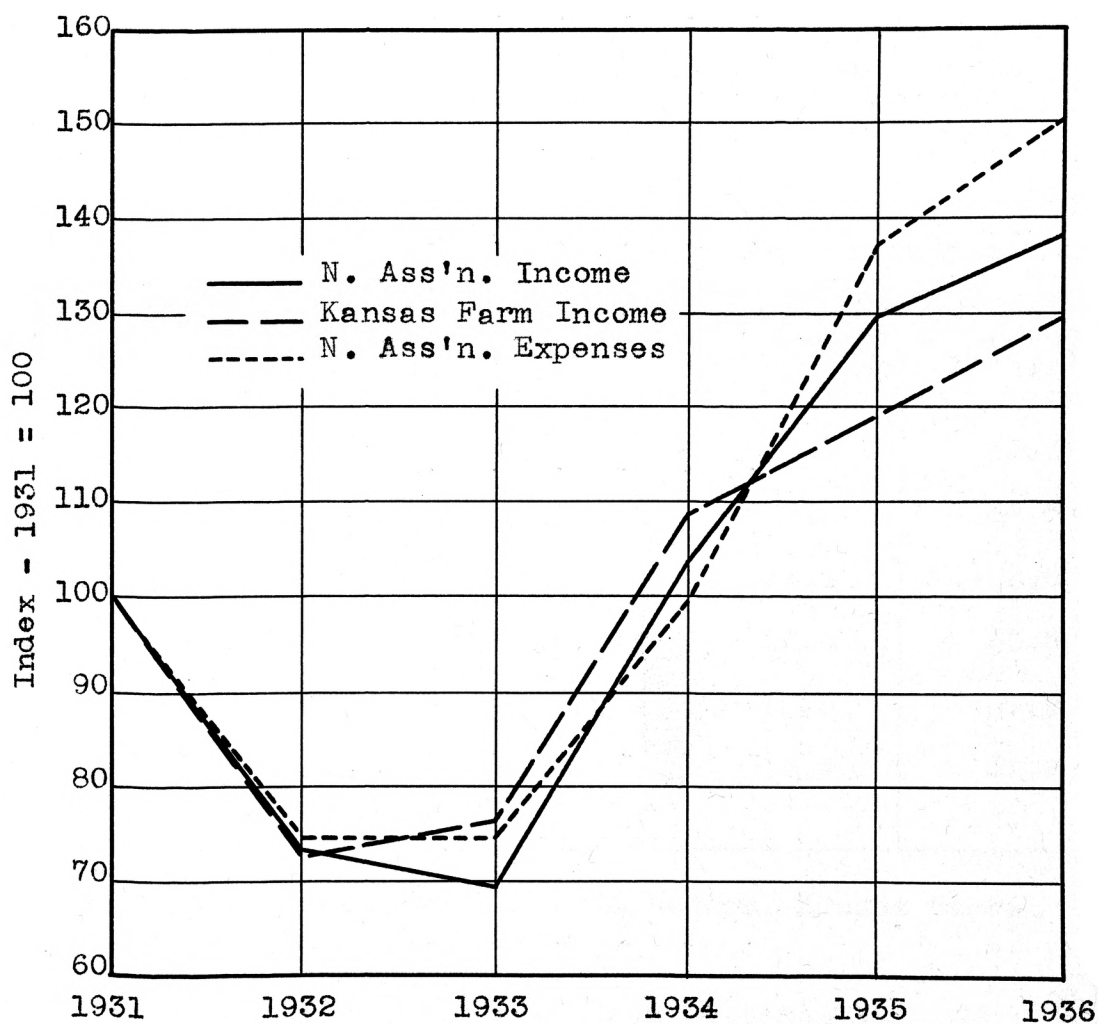


Fig. 2. Index of Average Cash Farm Income and Expenses of the Northern Association and Cash Income from Farm Marketing in Kansas, 1931 = 100.

Source: Cash Income from Farm Marketing in Kansas secured from Farm Income reports of Bureau of Agricultural Economics, United States Department of Agriculture.

Table VIII. Per Cent of Hogs Marketed in High and Low Seasonal Price Periods by Farmers in the Northern Association and in Kansas<sup>1</sup> 1931 to 1936.

| Year | High Period <sup>2</sup> |                     | Low Period <sup>3</sup> |                     |
|------|--------------------------|---------------------|-------------------------|---------------------|
|      | Association              | Kansas <sup>4</sup> | Association             | Kansas <sup>4</sup> |
| 1931 | 37.0                     | 26.8                | 13.1                    | 36.1                |
| 1932 | 49.5                     | 30.4                | 9.6                     | 34.5                |
| 1933 | 49.6                     | 43.1 <sup>5</sup>   | 18.0                    | 28.0                |
| 1934 | 37.1                     | 29.6                | 23.8                    | 35.8                |
| 1935 | 44.6                     | 28.0                | 22.5                    | 30.9                |
| 1936 | 50.8                     | 30.8                | 16.9                    | 32.2                |

<sup>1</sup>From a study conducted by J. A. Hodges, Kansas State College.

<sup>2</sup>Includes March, July, August, and September.

<sup>3</sup>Includes May, June, November, and December.

<sup>4</sup>Secured from Kansas State Agricultural Statistician.

<sup>5</sup>Sales were greatly increased by the purchasing program of the Agricultural Adjustment Administration during the high price months.

marketed a smaller proportion during the low months of May, June, November, and December. From a third to a half of the hogs raised on association farms are marketed during the high months. From one-fourth to two-fifths of the Kansas hogs are marketed during the same months.

Soil conserving crops, principally alfalfa and sweet clover, comprised an average of 8.2 per cent of the crop land in 1928 to 1932 in the nine counties of the area. In the Northern Association consecutive records from 1931 to 1935 showed approximately 19 per cent of the crop land was in soil conserving crops. Easily twice the proportion of the crop land in the association farms is used for soil conserving crops than for all farms in the area. This indicates good soil management.

Table IX shows a distribution of the 25 farm operators in the Northern Association which have consecutive records for the six years according to tenure and type of farming. It is intended to show the changes for identical operators in tenure and type of farming during the six years. The same farmer may be an owner one year and a renter the next year or a renter one year and an owner the next year. While the numbers are small, there was an increase in the number of rented farms in 1932, 1933, and 1934 and a decrease in owned farms. Part-owned farms have become more

Table IX. Distribution of the Farm Operators in the Northern Association  
Which Have Six Years of Consecutive Records according to  
Tenure and Type of Farming, 1931 to 1936.

|  | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | Total |
|--|------|------|------|------|------|------|-------|
| Tenure                                       |      |      |      |      |      |      |       |
| Owned  | 15   | 12   | 12   | 10   | 12   | 15   | 76    |
| Part-owned                                   | 7    | 8    | 7    | 10   | 10   | 9    | 51    |
| Rented                                       | 3    | 5    | 6    | 5    | 3    | 1    | 23    |
| Total  | 25   | 25   | 25   | 25   | 25   | 25   | 150   |
| Type of Farming                              |      |      |      |      |      |      |       |
| Dairy and General Dairy                      | 6    | 9    | 4    | 5    | 5    | 6    | 35    |
| Poultry and General Poultry                  | 5    | 7    | 5    | 6    | 6    | 6    | 35    |
| Cash Grain and General Crop                  | 2    | 2    | 6    | 4    | 4    | 8    | 26    |
| Livestock Specialty Beef<br>and General Beef | 5    | 4    | 7    | 5    | 9    | 3    | 33    |
| Livestock Specialty Hog<br>and General Hog   | 7    | 3    | 3    | 5    | 1    | 2    | 21    |
| Total  | 25   | 25   | 25   | 25   | 25   | 25   | 150   |



important in recent years. The dairy and poultry enterprises increased in importance in 1932. The number of hog farms declined somewhat. Beef cattle farms led in number in 1935 and cash-grain farms led in 1936. Nine of the 25 farms remained the same type throughout the period. The other farms changed materially in type.

The preceding tests indicate that the association farms are somewhat above the average farm. Larger farms have an opportunity for higher net income. Income increased more rapidly than for all farms in Kansas. The association farms have a larger proportion of the crop land in soil conserving crops than surrounding farms. A larger porportion of the hogs are marketed in the high months of the year than by all farmers in Kansas.

#### NORMALITY OF THE PERIOD OF YEARS, 1931 to 1936

Two important factors affecting the debt-carrying capacity are production and prices, both received and paid. Wheat and corn were the most important cash crops. Figure 3 shows the year-to-year and five-year moving average of the production of wheat and corn since 1910 for type-of-farming area 6a of Kansas. These data had been prepared previously for other studies. Area 6a represents the association area

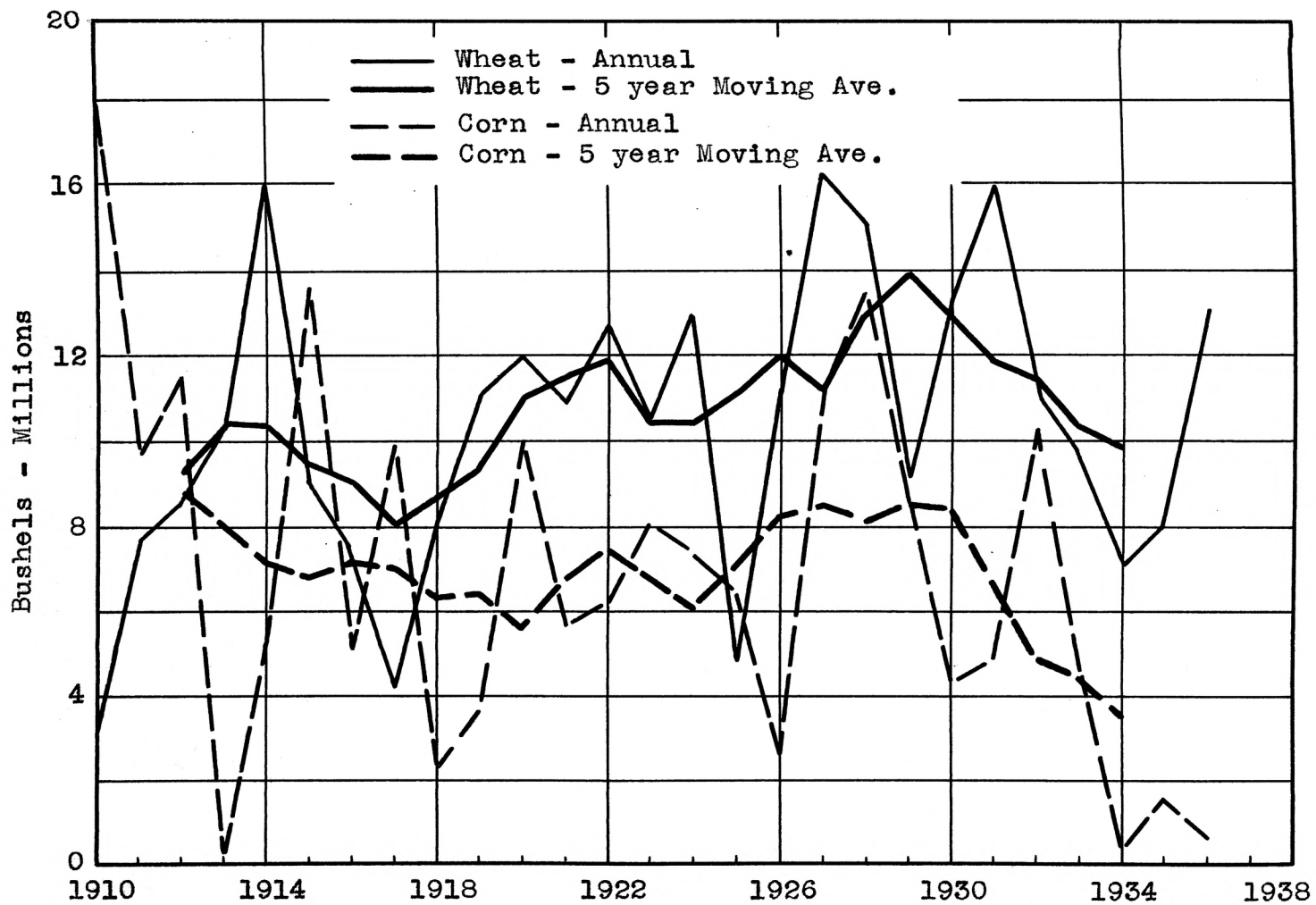


Fig. 3. Wheat and corn production in type of farming area 6a of Kansas. 1910 to 1936.

Source: Reports of Kansas State Board of Agriculture.

adequately. While there were wide fluctuations from year to year, the general trend as shown by the moving average was gradually upward to 1929. Since then production has been drastically lower.

Figure 4 shows the trend in the number of milk cows, other cattle and hogs since 1910 and hens since 1925. Hog numbers were higher in 1932 and 1933 than any time since 1923. Hog numbers in 1935 and 1936 were below any year since 1910. Other cattle reached a record high in number in 1934. A year later the number was below any year since 1914. Milk cows increased in 1935, but decreased in 1936. Number of hens showed a definitely downward trend since 1925.

Prices received by farmers and paid by farmers in the United States were used, since no yearly figures are available for the area. By using index numbers based on the 1910 to 1914 average the relative changes would be approximately the same for the area as for the United States. Figure 5 shows the trend of the indexes of prices received and prices paid. The prices received throughout the six years averaged lower than for any period since the beginning of this century. Prices received advanced materially since the low in 1932. Prices paid did not go as low as the prices received. They have advanced some since 1932,

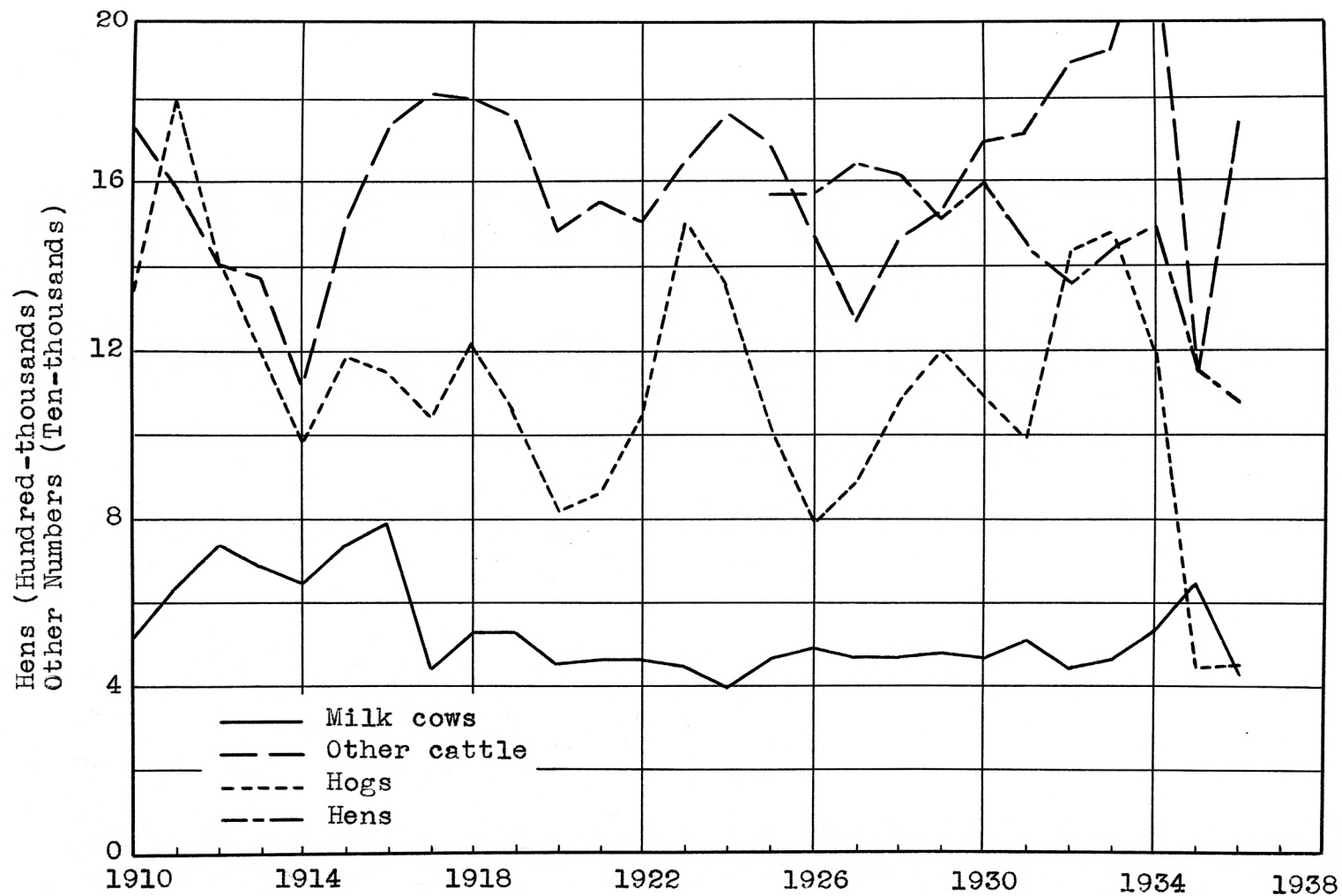


Fig. 4. Numbers of milk cows, other cattle, hogs, and hens in type-of-farming area 6a of Kansas. 1910 to 1936.

Source: Reports of Kansas State Board of Agriculture.

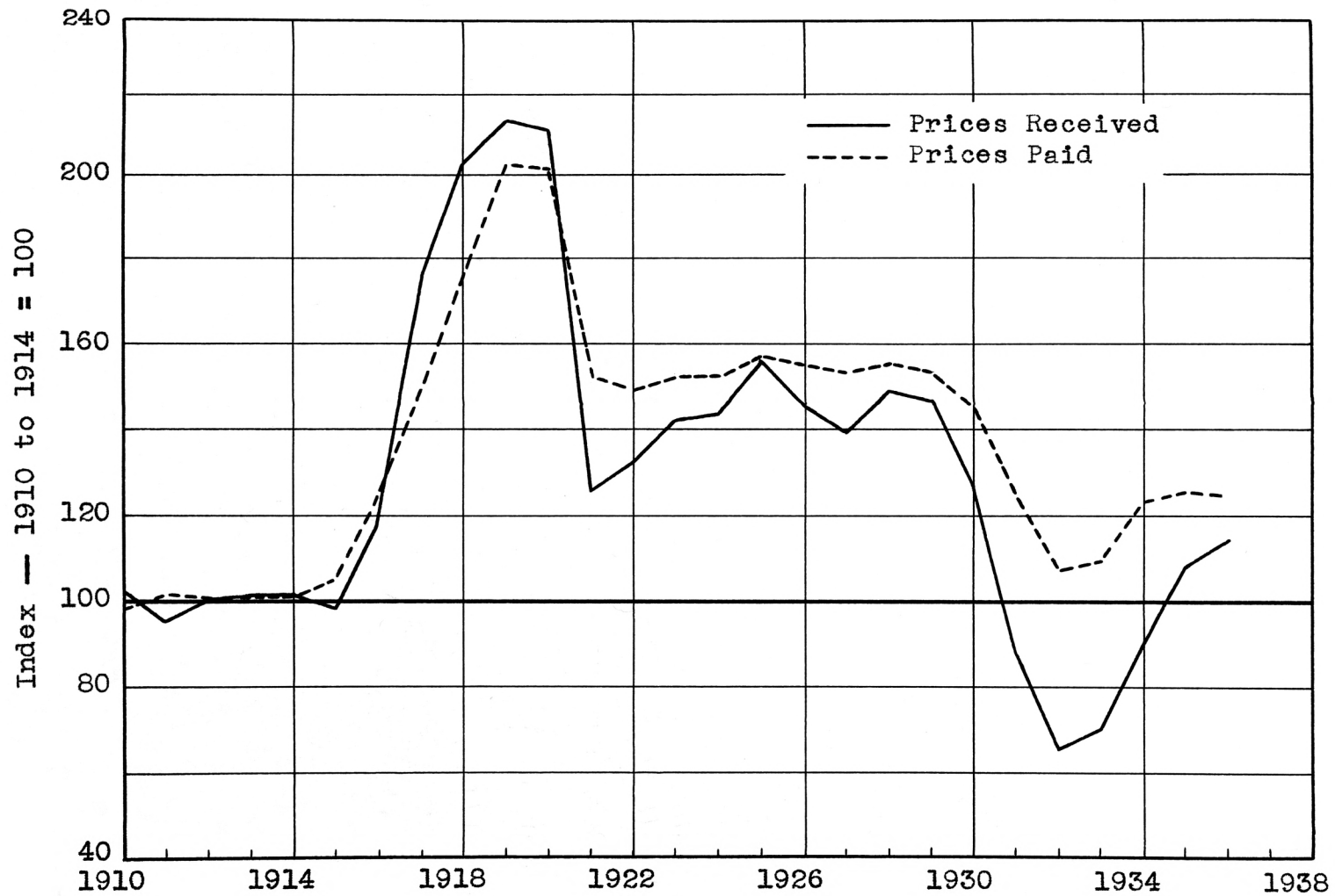


Fig. 5. Index of prices received and paid by farmers in the United States. 1910 - 1914 = 100.

Source: The Agricultural Situation, Bureau of Agricultural Economics, United States Department of Agriculture.

but not as much as prices received. The data for preparing the production and price trends are shown in Table XXV of the appendix.

It is evident that production in type-of-farming area 6a declined sharply as the prices advanced so that the farmers were unable to take full advantage of the better prices. Income was not as high as normally would be expected and costs for the association farms advanced more rapidly than income.

In applying the results of this study consideration should be given to the fact that the farms studied are somewhat above the average farm in their locality, but they were studied in a period of comparatively low production and income.

#### DEBT CARRYING CAPACITY AS DETERMINED BY THE INCOME AND EXPENSES OF THE FARM

An examination of farm records for income and expenses is necessary if the earning power is to be used as a basis for determining the amount of a loan. It is the amount of money available to use for debt that largely will determine how much debt can be carried. The amount available for debt can be determined by deducting from the farm income all farm expenses and the required cash living expenses. Should

the income from a farm amount to \$4,000, the farm expenses, excluding any interest payment, \$2,800, and cash living expenses \$700, there would remain \$500 that could be used for paying interest or interest and principal on a loan. The \$500 would pay the interest on a \$10,000 loan at a rate of 5 per cent. This \$10,000 is 2.5 times the \$4,000 income. Such an analysis has been made of the 642 farm records used in this study to show the income and expenses of the farms and the amount available for debt. As a part of this analysis the farms were classified by tenure and by type of farming.

#### Debt Carrying Capacity by Tenure

Income and Expenses. The cash income and cash farm and living expenses for the farms divided into tenure groups for the six years, 1931 to 1936 inclusive, are shown in Table X. The average income per farm for the six years was \$3,425. The average farm expense, excluding interest and principal payments, was \$2,376 or 69.4 per cent of the income. Living expenses averaged \$692 or 20.2 per cent of the income. The farm and living expenses used 89.6 per cent of the income. There was \$10.40 available to pay interest on debt for every \$100 of income. Assuming an



Table X. Income and Expenses for Farms in the Northern Association by Tenure for Six Years 1931 to 1936. (Weighted average)

| Tenure     | Number of farm records | Income | Farm Expenses |                    | Living Expenses |                    | Operating ratio |
|------------|------------------------|--------|---------------|--------------------|-----------------|--------------------|-----------------|
|            |                        |        | Amount        | Per cent of income | Amount          | Per cent of income |                 |
| Owned      | 253                    | 3,345  | 2,249         | 67.2               | 760             | 22.7               | 89.9            |
| Part-owned | 221                    | 3,947  | 2,775         | 70.3               | 679             | 17.2               | 87.5            |
| Rented     | 168                    | 2,858  | 2,042         | 71.4               | 606             | 21.2               | 92.6            |
| All farms  | 642                    | 3,425  | 2,376         | 69.4               | 692             | 20.2               | 89.6            |

interest rate of 5 per cent, these farms could have supported a debt of slightly more than two times the income, but doing so without a principal payment.

The average income was \$3,345 for owned farms, \$3,947 for part-owned farms, and \$2,858 for rented farms. It is evident that the part-owned farms have a larger business. It might follow that farm owners tend to be more conservative and do not attempt to manage as large a business as the part-owners. Part-owners might be those who are ambitious and choose to extend their operations on a larger scale by renting. Rented farms might be poorly equipped and the operators might have less incentive and managerial ability.

The farm expenses in per cent of income were least for owned farms, or 67.2 per cent. Part-owned farms followed with 70.3 per cent, and rented farms with 71.4 per cent of the income for farm expenses. The living expenses were highest for owned farms, \$760, and least for rented farms, \$606. Part-owned farms were about midway between these two groups or \$679. On the basis of per cent of income, the living expenses on part-owned farms were least, or 17.2 per cent. Living expenses on owned farms were 22.7 per cent of the income and for rented farms, 21.2 per cent. The differences in the incomes cause the relationships on a

percentage basis to be different than for actual cash living expenses. Farm and living expenses together in per cent of the income, the operating ratio, was for part-owned farms 87.5 per cent, for owned farms 89.9 per cent, and for rented farms 92.6 per cent. On the basis of the debt carrying capacity in relation to income, the tenure groups rank in the same order, or 2.0 for owned farms, 2.5 for part-owned farms, and 1.5 for rented farms, when 5 per cent interest is used. With size of income varying inversely to the operating ratio, the actual debt that can be carried is decidedly more for part-owned farms than the debt ratios indicate.

The data for each year, comparable to Table X, are shown in the appendix, Table XXVI. The farm expenses in per cent of income, living expenses in per cent of income, and the operating ratios are shown for each year in Table XI. The farm expenses in per cent of income for all farms increased throughout the period, from 58.6 in 1931 to 77.7 in 1936, except in 1934 when it fell below 1933. The fact that the number of cattle was at a peak in 1934 and because of the shortage of feed there was a heavy liquidation of cattle, cash income for that year was high and expenses were relatively low. The association area lies on the eastern border of the area in Kansas in which there was the

Table XI. Farm and Living Expenses in Per Cent of Income and Operating Ratios of the Farms in the Northern Association by Tenure, 1931 to 1936. (Weighted average)

| Tenure                                | 1931 | 1932 | 1933  | 1934 | 1935 | 1936 | Six<br>years |
|---------------------------------------|------|------|-------|------|------|------|--------------|
| Farm Expenses in Per Cent of Income   |      |      |       |      |      |      |              |
| Owned                                 | 54.4 | 62.9 | 63.6  | 61.3 | 77.4 | 79.4 | 67.2         |
| Part-owned                            | 63.0 | 60.9 | 73.8  | 64.0 | 78.3 | 75.2 | 70.3         |
| Rented                                | 63.1 | 64.3 | 77.5  | 68.8 | 69.2 | 78.9 | 71.4         |
| All farms                             | 58.6 | 62.3 | 70.1  | 64.2 | 75.9 | 77.7 | 69.4         |
| Living Expenses in Per Cent of Income |      |      |       |      |      |      |              |
| Owned                                 | 28.2 | 32.4 | 26.2  | 20.6 | 16.6 | 18.3 | 22.7         |
| Part-owned                            | 26.1 | 19.9 | 18.9  | 18.2 | 13.8 | 12.6 | 17.2         |
| Rented                                | 31.0 | 25.5 | 22.6  | 18.9 | 17.5 | 20.3 | 21.2         |
| All farms                             | 27.9 | 25.5 | 22.9  | 19.2 | 15.5 | 16.5 | 20.2         |
| Operating Ratio                       |      |      |       |      |      |      |              |
| Owned                                 | 82.6 | 95.3 | 89.8  | 81.9 | 94.0 | 97.7 | 89.9         |
| Part-owned                            | 89.1 | 80.8 | 92.7  | 82.2 | 92.1 | 87.8 | 87.5         |
| Rented                                | 94.1 | 89.8 | 100.1 | 87.7 | 86.7 | 99.2 | 92.6         |
| All farms                             | 86.5 | 87.8 | 93.0  | 83.4 | 91.4 | 94.2 | 89.6         |

heaviest buying of cattle by the government in 1934. The increase in farm expenses in per cent of income in 1935 was due partly to farmers restocking their farms with cattle. This may have been continued through 1936, but principally the low production of crops and the large purchases of feed increased the expenses in relation to income. The tenure groups ranked in the same order for farm expenses in per cent of income for 1931, 1933, and 1934 as for the six years combined; that is, owned farms were the lowest, followed by part-owned and rented farms. Part-owned farms had the lowest farm expenses in per cent of income in 1932 and 1936. Rented farms were lowest in 1935.

Living expenses in per cent of income for all farms decreased each year from 27.9 per cent in 1931 to 15.5 per cent in 1935, but increased to 16.5 per cent in 1936. In relation to income, families on rented farms reduced their living expenses more than those on owned farms during the worst years--1932, 1933, and 1934. The living expenses in per cent of income for families on owned farms were highest of the tenure groups for each of these years, while for the other three years, 1931, 1935, and 1936, the families on the rented farms used the largest per cent of their income for living expenses. The actual living expenses were highest for the families on owned farms each year except

1934 and 1935. The families on part-owned farms spent more in 1934 and 1935 than for either of the other tenure groups. Families on rented farms spent the least for each year except in 1932 and 1933 when the actual living expenses were least for the families on part-owned farms. In each tenure group the actual living expenses were reduced during 1932 and 1933.

The operating ratios tended to increase slightly during the six years as is shown graphically in figure 6. For all farms the ratio was 86.5 in 1931, 87.8 in 1932, 93.0 in 1933, 83.4 in 1934, 91.4 in 1935, and 94.2 in 1936. The operating ratio for owned farms was at a peak for the six years in 1936 and a low in 1934. The ratio went up in 1932, then down in 1933 and 1934 and up again in 1935 and 1936. For part-owned farms the high was in 1933 and the low was in 1932. The ratio was up one year and down the next throughout the period. The operating ratio for rented farms was highest in 1933 and lowest in 1935. It increased in 1936 to nearly the same level as in 1933.

A part of Table XII shows the ratio of debt to income at capacity load with a 5 per cent interest rate and the actual amount of debt that can be carried for each year and for the tenure groups for the six years. The years and tenure groups would remain in the same relation regardless

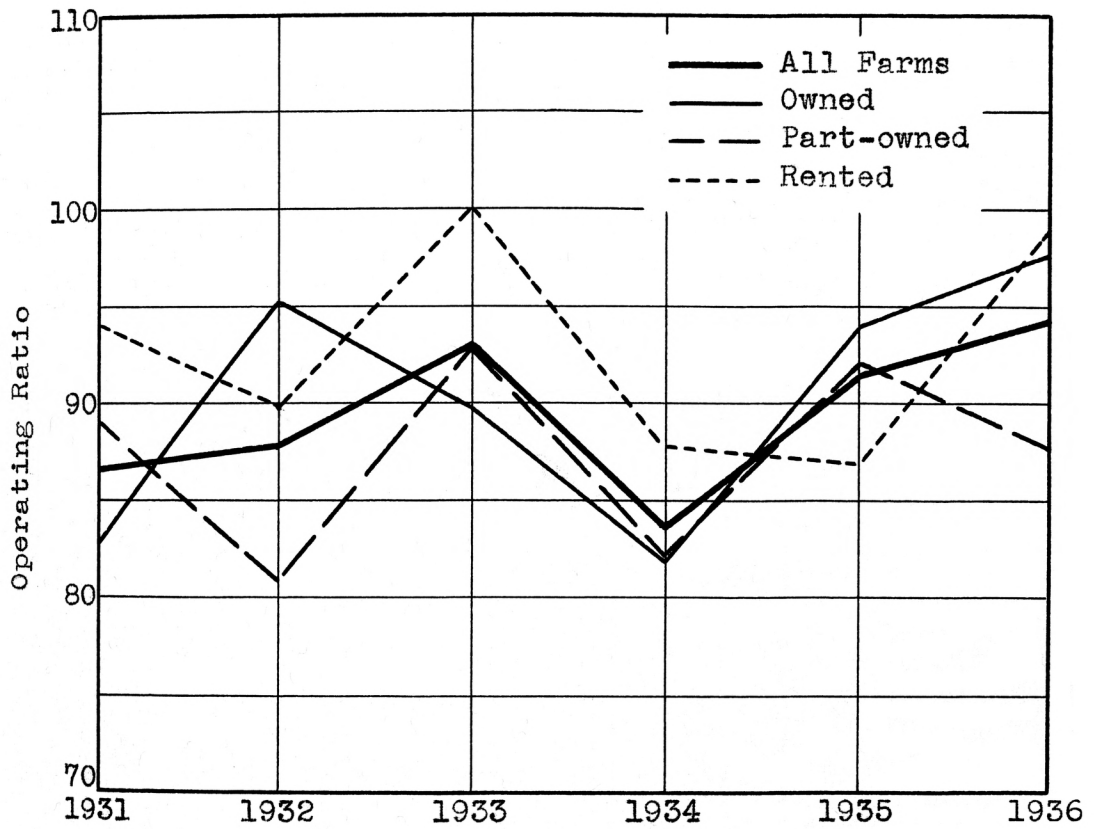


Fig. 6. Trend in the operating ratios of the farms in the Northern Association by tenure, 1931 to 1936.



Table XII. Average Debt and Debt Carrying Capacity of the Farms in the Northern Association from 1931 to 1936 and by Tenure.

|  | 1931  | 1932  | 1933  | 1934   | 1935  | 1936  | Six Years |       |            |        |
|--|-------|-------|-------|--------|-------|-------|-----------|-------|------------|--------|
|  |       |       |       |        |       |       | All farms | Owmed | Part-owned | Rented |
| Cash Income  | 3,350 | 2,451 | 2,323 | 3,459  | 4,345 | 4,630 | 3,425     | 3,345 | 3,947      | 2,858  |
| Operating Ratio  | 86.5  | 87.8  | 93.0  | 83.4   | 91.4  | 94.2  | 89.6      | 89.9  | 87.5       | 92.6   |
| Capacity Debt - Ratio of Debt to Income at 5 per cent interest | 2.7   | 2.4   | 1.4   | 3.3    | 1.7   | 1.2   | 2.1       | 2.0   | 2.5        | 1.5    |
| Capacity Debt - Actual   | 9,045 | 5,882 | 3,252 | 11,415 | 7,386 | 5,556 | 7,192     | 6,690 | 9,868      | 4,287  |
| Actual Debt Carried  | 5,572 | 5,607 | 4,909 | 5,299  | 5,210 | 4,241 | 5,135     | 6,254 | 6,261      | 2,003  |
| Ratio of Actual Debt to Income                                 | 1.7   | 2.3   | 2.1   | 1.5    | 1.2   | 0.9   | 1.5       | 1.9   | 1.6        | 0.7    |

of the interest rate used. The debt carrying capacity in relation to income was highest in 1934 or 3.3 and lowest in 1936 or 1.2. It was 2.7 in 1931, 2.4 in 1932, 1.4 in 1933, and 1.7 in 1935. The actual debt that could have been carried in 1936 was nearly as great as in 1932 because of the increase in income. Table XII also shows that the actual debt in 1933 exceeded the capacity debt. The debt in 1932 was nearly as large as the capacity debt. The actual debt carried by the farms decreased from an average of \$5,572 in 1931 to \$4,241 in 1936. The debt was slightly higher for part-owned farms than for owned farms, or a little over \$6,000 for each. The average debt for the rented farms was about \$2,000. These averages were secured by including the farms without debt. Approximately seven-eighths of the farms had interest-bearing debts.

Most Frequent Operating Ratios. It is desirable to know what is the most frequent range in the operating ratios, as well as the weighted average. The weighted averages, which have been discussed above, are influenced in some cases by extreme ratios, especially high ratios. One usually is interested in knowing what is the common operating ratio, hence, the usual debt carrying capacity in relation to income. Table XIII shows the percentage distribution of the farms for each year and by tenure.

Table XIII. Percentage Distribution of the Farms in the Northern Association According to the Operating Ratio by Years and by Tenure.

| Operating Ratio | 1931  | 1932             | 1933  | 1934  | 1935  | 1936  | Six<br>years | Owned | Part-<br>owned | Rented           |
|-----------------|-------|------------------|-------|-------|-------|-------|--------------|-------|----------------|------------------|
| 30.1 to 40.0    | 3.2   | 2.0 <sup>1</sup> |       | 0.8   |       |       | 1.0          | 1.6   | 0.4            | 0.6 <sup>1</sup> |
| 40.1 to 50.0    | 4.3   | 3.1              | 1.7   | 3.2   | 0.9   |       | 2.2          | 2.8   | 2.3            | 1.2              |
| 50.1 to 60.0    | 5.4   | 5.2              | 7.8   | 8.0   | 2.7   | 3.0   | 5.4          | 4.0   | 8.1            | 4.2              |
| 60.1 to 70.0    | 7.5   | 13.4             | 13.9  | 10.4  | 11.6  | 7.0   | 10.7         | 12.2  | 10.8           | 8.3              |
| 70.1 to 80.0    | 19.5  | 16.5             | 19.2  | 15.2  | 11.6  | 9.0   | 15.1         | 15.4  | 14.5           | 15.5             |
| 80.1 to 90.0    | 18.3  | 15.5             | 16.5  | 20.8  | 20.5  | 25.0  | 19.6         | 19.4  | 18.6           | 20.8             |
| 90.1 to 100.0   | 11.8  | 11.3             | 11.3  | 15.2  | 21.3  | 14.0  | 14.3         | 13.0  | 16.8           | 13.1             |
| 100.1 to 110.0  | 8.6   | 5.2              | 6.1   | 10.4  | 10.7  | 18.0  | 9.8          | 10.3  | 10.0           | 8.9              |
| 110.1 to 120.0  | 6.4   | 8.2              | 5.2   | 3.2   | 3.6   | 6.0   | 5.3          | 3.6   | 6.8            | 6.0              |
| 120.1 to 130.0  | 3.2   | 4.1              | 4.4   | 5.6   | 4.5   | 7.0   | 4.8          | 4.3   | 3.6            | 7.1              |
| 130.1 to 140.0  | 4.3   | 4.1              | 3.5   | 0.8   | 5.4   | 4.0   | 3.6          | 3.2   | 3.6            | 4.2              |
| 140.1 to 150.0  |       | 2.1              | 1.7   | 3.2   | 3.6   | 5.0   | 2.6          | 4.3   | 0.4            | 3.0              |
| 150.1 and more  | 7.5   | 9.3              | 8.7   | 3.2   | 3.6   | 2.0   | 5.6          | 5.9   | 4.1            | 7.1              |
| Total           | 100.0 | 100.0            | 100.0 | 100.0 | 100.0 | 100.0 | 100.0        | 100.0 | 100.0          | 100.0            |

<sup>1</sup>Includes one farm with a ratio of 25.5.

These data and similar data for each year for each tenure group which are given in the appendix, Tables XXVII, XXVIII, and XXIX, have been plotted on figure 7. The patterns of distributions appear quite similar for the tenure groups for the six years combined. There was a slight positive skewness in each case, that is, there were more farms above the modal range than below the modal range. Except for 1934 there were fewer farms each succeeding year in the lower ranges of the operating ratios. There were quite definite variations in the patterns from year to year for each tenure group.

Table XIV shows the modal range for each type of tenure for each year and for all the farms. The modal range in the operating ratios for the six years, was from 80 to 90 for each type of tenure and for all the farms together. Except for the rented farms, the weighted average is within the modal range for the six years. The average operating ratio of 92.6 was above the modal range of 80 to 90 for the rented farms. Examination of the frequency distribution shows a larger proportion of the rented farms with operating ratios above the modal range than in the cases of owned and part-owned farms. For all the farms the average operating ratios were within the modal ranges only in 1934 and 1935 and were below for the other years. The average was within

Per Cent of Farms

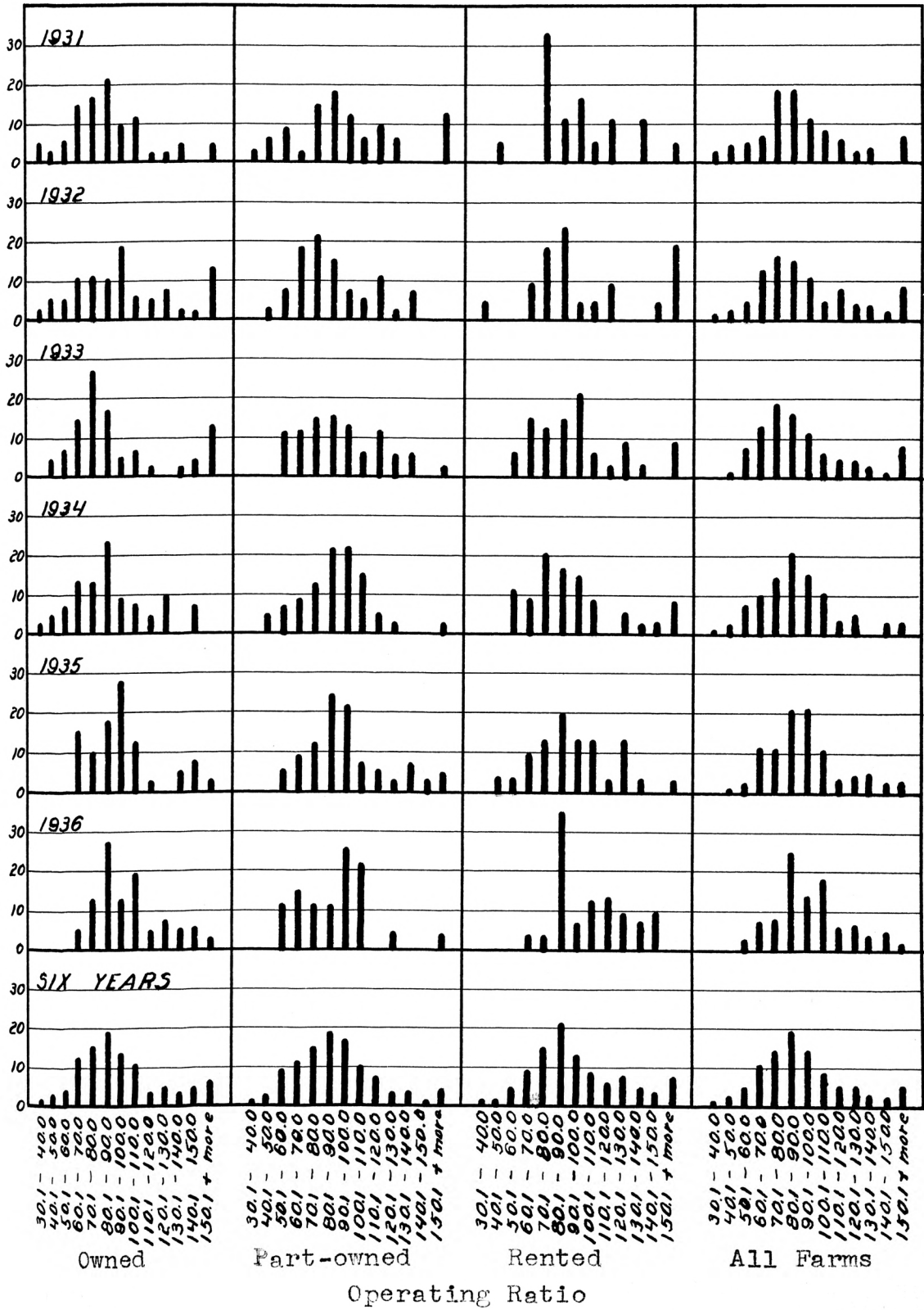


Fig. 7. Percentage distribution of the farms in the Northern Association according to the operating ratio by Tenure, 1931 to 1936.

Table XIV. Modal Range of the Operating Ratios of Farms in the Northern Association by Tenure, 1931 to 1936.

| Tenure     | 1931  | 1932   | 1933   | 1934                | 1935   | 1936   | Six<br>years |
|------------|-------|--------|--------|---------------------|--------|--------|--------------|
| Owned      | 80-90 | 90-100 | 70-80  | 80-90               | 90-100 | 80-90  | 80-90        |
| Part-owned | 80-90 | 70-80  | 80-90  | 90-100 <sup>1</sup> | 80-90  | 90-100 | 80-90        |
| Rented     | 70-80 | 80-90  | 90-100 | 70-80               | 80-90  | 80-90  | 80-90        |
| All farms  | 70-80 | 70-80  | 70-80  | 80-90               | 90-100 | 80-90  | 80-90        |

<sup>1</sup>An equal per cent of the farms was in the range of 80 to 90. The distribution was positively skewed.

the modal range for owned farms each year except 1933 and 1936 when the averages were below the modal ranges. For part-owned farms, the average was below the modal range each year except 1931 and 1934. The average for rented farms was below the modal range each year except 1934.

The class mark of the modal range of the operating ratio for the six years for each type of tenure and for all farms was 85. This allowed a margin of 15 per cent which would pay 5 per cent interest on a debt three times the income. The weighted average operating ratio would permit a debt ratio of 2.1 for all farms. The frequency distributions are nearly normal for 1934 and 1935, but positively skewed for the other years.

Tables XXX and XXXI in the appendix show the frequency distributions of the farm expenses in per cent of income and living expenses in per cent of income.

Variations in Operating Ratios. In using an average or range to represent a group of cases, one should know what variation from the average might be expected. If the variation is small, the average may be used with greater confidence and with less chance for an error. The variation can be secured by calculating the standard deviation of the mean or simple average. This figure expressed in per cent of the mean is known as the coefficient of



variation. It furnishes a figure comparable for different groups of data.

Table XV shows the coefficient of variation of the farms for each year and for the six years by tenure. The coefficient of variation of the operating ratio for all the farms for the six years was 41 per cent. This figure means that if the operating ratios were calculated on additional farms selected under the same conditions, approximately two-thirds of the operating ratios would be within the range of a plus and minus 41 per cent of the average from the average or in this case a range of 56.6 to 135.0. Owned farms had a slightly higher coefficient of variation than for the part-owned or rented farms. The range to include two-thirds of the cases was for owned farms 54.1 to 138.3, part-owned farms 56.5 to 127.9, and rented farms 61.4 to 138.6. The variation declined from 52.1 per cent in 1931 to 25.1 per cent in 1936. Each year the coefficient of variation was less than the previous year except 1932 which was 54.8. The coefficients of variation declined for each type of tenure but less evenly than for all the farms. The farm expenses in per cent of income varied least for the part-owned farms. The owned and rented farms were about the same. The living expenses in per cent of income varied the most for owned farms and least for rented farms. The

Table XV. Dispersion of Farm and Living Expenses in Per Cent of Income and Operating Ratios for Farms in the Northern Association by Tenure, 1931 to 1936. (Coefficient of Variation)

| Tenure                                | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | Six<br>years |
|---------------------------------------|------|------|------|------|------|------|--------------|
| Farm Expenses in Per Cent of Income   |      |      |      |      |      |      |              |
| Owned                                 | 43.8 | 54.9 | 72.7 | 39.6 | 31.0 | 28.2 | 48.9         |
| Part-owned                            | 67.8 | 27.3 | 44.2 | 26.2 | 36.4 | 29.8 | 42.4         |
| Rented                                | 27.6 | 85.0 | 66.7 | 33.9 | 32.9 | 24.4 | 49.3         |
| All Farms                             | 55.9 | 63.4 | 58.3 | 32.9 | 33.8 | 28.3 | 47.0         |
| Living Expenses in Per Cent of Income |      |      |      |      |      |      |              |
| Owned                                 | 71.8 | 86.6 | 77.1 | 52.5 | 58.3 | 54.9 | 77.6         |
| Part-owned                            | 69.6 | 60.5 | 71.0 | 50.1 | 45.3 | 56.0 | 66.1         |
| Rented                                | 67.3 | 51.5 | 51.1 | 50.2 | 47.0 | 55.8 | 56.1         |
| All Farms                             | 70.1 | 71.0 | 73.7 | 51.7 | 52.3 | 57.0 | 70.0         |
| Operating Ratio                       |      |      |      |      |      |      |              |
| Owned                                 | 43.1 | 53.4 | 59.7 | 26.9 | 27.3 | 23.5 | 43.8         |
| Part-owned                            | 63.8 | 27.5 | 37.2 | 24.6 | 29.7 | 25.3 | 38.7         |
| Rented                                | 37.8 | 69.2 | 36.2 | 36.5 | 28.0 | 23.6 | 38.6         |
| All Farms                             | 52.1 | 54.8 | 47.3 | 31.4 | 28.4 | 25.1 | 41.0         |

coefficients of variations did not decline for the living expenses to the same extent as the operating ratios during the years. In some cases the coefficients of variation could have been reduced considerably by leaving out a few extreme cases. This would not give a true indication of what might be expected.

Comparability of Tenure Groups. The possibility that the income and expenses for the types of tenure were not comparable was considered. The operator of an owned farm pays real estate taxes and upkeep on improvements. A cash renter might receive the same income but has rent as a cash expense, but no real estate taxes or upkeep on the buildings. The share renter receives less cash income by giving a share of the products, pays no cash rent, real estate taxes or upkeep on the buildings. The part-owned farms have various arrangements. Because of the variation in what the landlord might furnish, such as seed, upkeep on the buildings, and whether or not the renter paid part of the taxes, it would be impossible to make the farms absolutely comparable. Their comparability was tested by adjusting the income and expenses for each of the farms in 1935. The value of the share rent paid was added to the income. Taxes, insurance, cash rent, and costs and repairs for improvements were subtracted from the expenses. The

remaining expenses in per cent of the income is not the true operating ratio. In comparing these ratios with those before the adjustments were made, there is no change in the relative position of the tenure groups. Table XVI shows this comparison.

#### Debt Carrying Capacity by Type of Farming

Income and Expenses. The farms were reclassified by type of farming and the average income, farm expenses, and living expenses determined for each type. In general, the same analysis was made as for the farms classified by tenure.

The cash income for beef farms was far greater than for the other types of farming, or an average of \$4,811 for the six years. Hog farms followed with an average of \$3,626, cash grain \$2,992, poultry \$2,881, and dairy \$2,838. These figures and the expense figures are shown in Table XVII. The farm expenses in per cent of income were greatest for the hog farms, 74.9 per cent, followed by the beef farms with 71.2 per cent and the other three types each about 66.0 per cent. The living expenses were greater for the families on beef farms, or \$862, and least for those on poultry farms, or \$557. The living expenses of families

Table XVI. Comparison of the Farm and Living Expenses in Per Cent of Income and the Operating Ratios Adjusted for Tenure Comparability<sup>1</sup> with the Unadjusted for Farms in the Northern Association in 1935. (Weighted Average)

| Tenure     | Per cent Farm Expenses of Income |          | Per Cent Living Expenses of Income |          | Operating Ratio |          |
|------------|----------------------------------|----------|------------------------------------|----------|-----------------|----------|
|            | Unadjusted                       | Adjusted | Unadjusted                         | Adjusted | Unadjusted      | Adjusted |
| Owned      | 77.4                             | 66.4     | 16.6                               | 16.6     | 94.0            | 83.0     |
| Part-owned | 78.3                             | 67.8     | 13.8                               | 13.2     | 92.1            | 81.0     |
| Rented     | 69.2                             | 51.5     | 17.5                               | 15.1     | 86.7            | 66.6     |
| All Farms  | 75.9                             | 62.8     | 15.5                               | 14.6     | 91.4            | 77.4     |

<sup>1</sup>Share rent added to income. Taxes, insurance, cash rent, and cost of improvements subtracted from expenses.

Table XVII. Income and Expenses for Farms in the Northern Association by Type of Farming for Six Years, 1931 to 1936. (Weighted Average)

| Type of Farming                           | Number of farm records | Income | Farm Expenses |                    | Living Expenses |                    | Operating ratio |
|---|------------------------|--------|---------------|--------------------|-----------------|--------------------|-----------------|
|   |                        |        | Amount        | Per cent of income | Amount          | Per cent of income |                 |
| Dairy and General Dairy                   | 140                    | 2,838  | 1,877         | 66.1               | 611             | 21.5               | 87.6            |
| Poultry and General Poultry               | 76                     | 2,881  | 1,922         | 66.7               | 557             | 19.3               | 86.0            |
| Cash Grain and General Crop               | 173                    | 2,992  | 1,978         | 66.1               | 663             | 22.1               | 88.2            |
| Livestock Specialty Beef and General Beef | 125                    | 4,811  | 3,427         | 71.2               | 862             | 17.9               | 89.1            |
| Livestock Specialty Hog and General Hog   | 128                    | 3,626  | 2,715         | 74.9               | 741             | 20.4               | 95.3            |

on dairy farms were \$611, on cash grain farms \$663, and on hog farms \$741. The opportunity for the family to secure more products from the farm is greatest for those on poultry farms. The family uses considerable poultry products. Families on dairy farms have a similar opportunity. Beef farms contribute a smaller amount of the family living costs. Goodman (10) shows that the value of beef furnished to the family is less than for either poultry and dairy products. Frequently a poultry farm will have a sufficient number of cows to provide the family requirements for dairy products. Similarly, dairy farms frequently have sufficient poultry to supply the poultry needs of the family.

Because of the differences in income, the types rank in a different order on the basis of living expenses in per cent of income than for actual living expenses. Beef farms have the lowest per cent, or 17.9. They are followed by the poultry farms with 19.3 per cent, hog farms 20.4 per cent, dairy farms 21.5 per cent, and cash grain farms 22.1 per cent.

The operating ratios were for hog farms 95.3, beef 89.1, cash grain 88.2, dairy 87.6, and poultry 86.0. For the period of years, 1931 to 1936, the hog farms could carry the least debt in relation to income. Poultry and dairy farms generally are recognized as conservative. The poultry



and dairy enterprises provide sources for current income throughout most of the year. There is no large income at one particular time of the year as frequently would be the case for cash-grain farms or beef farms. The expenses usually can be kept lower. The farm generally provides for the feed requirements. Labor in caring for the poultry and dairy enterprise is required throughout the year and occurs mostly in the mornings and evenings when other enterprises would not use the labor. Wheat, the principal crop for the cash grain farms, is considered as usually a profitable enterprise in Kansas. Beef farms are considered more risky. Returns in most investment fields generally average higher where there is greater risk. The hog raiser in Kansas has been confronted with a shortage of feed grain and low production.

Tables XXXII to XXXVII of the appendix show the figures comparable to those in Table XVII for each of the six years. The farm and living expenses each in per cent of income and the operating ratios for each year by type of farming are shown in Table XVIII. Totals for all farms for each year were not included in this table, as they were shown in the tenure tables. Figure 8 shows the trend in the operating ratios by type of farming. The dairy and poultry farm operating ratios tended to go in the same direction and



Table XVIII. Farm and Living Expenses in Per Cent of Farm Income and Operating Ratios for the Farms in the Northern Association by Type of Farming, 1931 to 1936. (Weighted Average)

| Type of Farming                              | 1931 | 1932  | 1933  | 1934 | 1935 | 1936  | Six<br>years |
|--|------|-------|-------|------|------|-------|--------------|
| Farm Expenses in Per Cent of Income          |      |       |       |      |      |       |              |
| Dairy and General Dairy                      | 58.1 | 60.9  | 55.9  | 65.8 | 72.9 | 79.8  | 66.1         |
| Poultry and General Poultry                  | 57.2 | 55.8  | 55.4  | 69.3 | 72.7 | 70.7  | 66.7         |
| Cash Grain and General Crop                  | 51.5 | 66.3  | 73.0  | 59.5 | 71.3 | 69.7  | 66.1         |
| Livestock Specialty Beef<br>and General Beef | 55.8 | 56.0  | 80.1  | 61.1 | 81.0 | 91.6  | 71.2         |
| Livestock Specialty Hog<br>and General Hog   | 66.2 | 78.8  | 61.5  | 75.2 | 79.5 | 80.9  | 74.8         |
| Living Expenses in Per Cent of Income        |      |       |       |      |      |       |              |
| Dairy and General Dairy                      | 30.8 | 24.1  | 19.5  | 22.6 | 17.2 | 14.7  | 21.5         |
| Poultry and General Poultry                  | 28.7 | 29.3  | 22.3  | 18.7 | 13.6 | 16.3  | 19.3         |
| Cash Grain and General Crop                  | 25.9 | 26.5  | 25.0  | 19.8 | 19.6 | 22.6  | 22.1         |
| Livestock Specialty Beef<br>and General Beef | 25.8 | 23.4  | 21.8  | 15.9 | 13.3 | 10.6  | 17.9         |
| Livestock Specialty Hog<br>and General Hog   | 28.5 | 29.8  | 22.9  | 20.4 | 16.2 | 14.6  | 20.4         |
| Operating Ratio                              |      |       |       |      |      |       |              |
| Dairy and General Dairy                      | 88.9 | 85.0  | 75.4  | 88.4 | 90.1 | 94.5  | 87.6         |
| Poultry and General Poultry                  | 85.9 | 85.1  | 77.7  | 88.0 | 86.3 | 87.0  | 86.0         |
| Cash Grain and General Crop                  | 77.4 | 92.8  | 98.0  | 79.3 | 90.9 | 92.3  | 88.2         |
| Livestock Specialty Beef<br>and General Beef | 81.6 | 79.4  | 101.9 | 77.0 | 94.3 | 102.2 | 89.1         |
| Livestock Specialty Hog<br>and General Hog   | 94.7 | 108.6 | 84.4  | 95.6 | 95.7 | 95.5  | 95.2         |

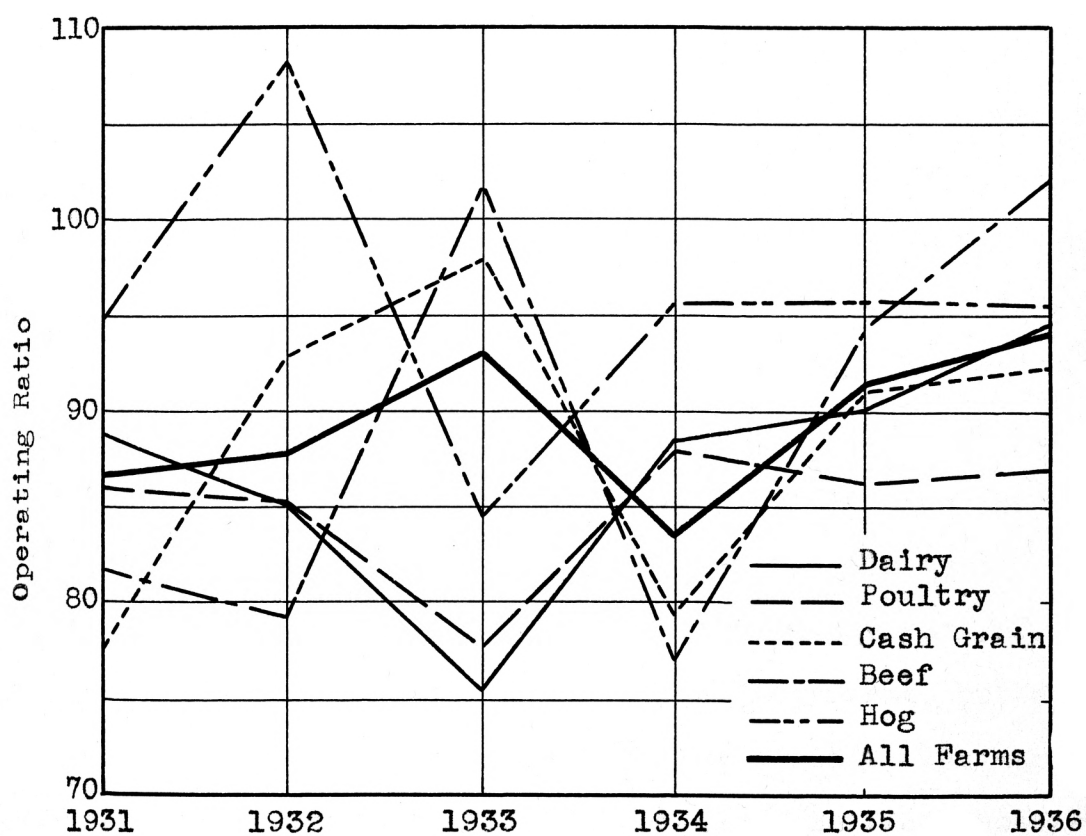


Fig. 8. Trend in the operating ratios of the farms in the Northern Association by type of farming. 1931 to 1936.

stay together. There was a tendency for the operating ratios of the cash grain and beef farms to run parallel and not far apart. The operating ratios of these two types advanced in 1933 and declined in 1934, whereas, the operating ratios for the dairy, poultry, and hog farms declined in 1933 and advanced in 1934. The least variation in the average operating ratio from year to year was for the poultry farms. The range was from 77.7 in 1933 to 88.0 in 1934. The variation for the beef farms was the greatest, varying from 77.0 in 1934 to 102.2 in 1936. In general the farm expenses in per cent of income increased for all types during the six years. The farm expenses in per cent of income declined in 1933 for the dairy and hog farms, but advanced again throughout the rest of the period. The same was true for the cash grain and beef farms in 1934; however, the farm expenses in per cent of income decreased slightly in 1936 from 1935 for the cash grain farms. Poultry farms showed a slight decline from 1931 to 1933, followed by advances in 1934 and 1935, and a slight decline in 1936. It is evident for all the types that the farm expenses increased at a faster rate than the income. The drought years of 1934 and 1935 and the sharp increase in the purchasing and repairing of machinery and improvements are factors causing the increase.

The living expenses in per cent of income generally decreased for all types during the period. There were only slight deviations from the general decrease. The living expenses in per cent of the income increased in 1936 over 1935 for poultry and cash grain farms. The incomes for these two types did not increase as much relatively as for the other types of farming. Also, the actual living expenses materially increased for families on the poultry and cash grain farms.

Most Frequent Operating Ratios. A percentage distribution of the farms in each type of farming for the six years according to the operating ratio is shown in Table XIX. Figure 9 shows the graphic picture of these distributions and the distributions for each year by type of farming, the data for which are shown in the appendix, Tables XXXVIII to XLII. Table XX shows the modal range for each type for each year and for the six years. For the six years the weighted average operating ratio as shown in Table XVIII is within the modal range for the poultry and cash grain farms and below for the other three types. The frequency distributions show a marked positive skewness for the beef farms and positive skewness for the dairy and hog farms. The weighted average operating ratio for the poultry farms was within the modal range for each of the six years. The

Table XIX. Percentage Distribution of the Farms in the Northern Association According to the Operating Ratio by Type of Farming for Six Years, 1931 to 1936.

| Operating Ratio | Dairy | Poultry | Cash Grain | Beef             | Hog   |
|-----------------|-------|---------|------------|------------------|-------|
| 30.1 to 40.0    | 0.7   |         | 1.2        | 2.4 <sup>1</sup> |       |
| 40.1 to 50.0    | 2.1   | 1.3     | 4.0        | 2.4              |       |
| 50.1 to 60.0    | 9.3   | 2.6     | 4.6        | 6.4              | 3.1   |
| 60.1 to 70.0    | 10.0  | 10.5    | 11.0       | 15.2             | 7.0   |
| 70.1 to 80.0    | 17.9  | 18.5    | 13.3       | 12.0             | 17.2  |
| 80.1 to 90.0    | 17.1  | 26.4    | 21.9       | 12.8             | 20.3  |
| 90.1 to 100.0   | 15.7  | 10.5    | 13.8       | 12.8             | 15.6  |
| 100.1 to 110.0  | 8.6   | 11.8    | 7.5        | 9.6              | 14.1  |
| 110.1 to 120.0  | 5.0   | 5.3     | 6.4        | 5.9              | 3.9   |
| 120.1 to 130.0  | 4.3   | 5.3     | 4.0        | 3.2              | 7.8   |
| 130.1 to 140.0  | 2.9   | 2.6     | 3.0        | 4.8              | 4.7   |
| 140.1 to 150.0  | 2.1   | 1.3     | 3.5        | 4.0              | 1.6   |
| 150.1 and more  | 4.3   | 3.9     | 5.8        | 8.8              | 4.7   |
| Total           | 100.0 | 100.0   | 100.0      | 100.0            | 100.0 |

<sup>1</sup>Includes a 25.5 Operating Ratio.

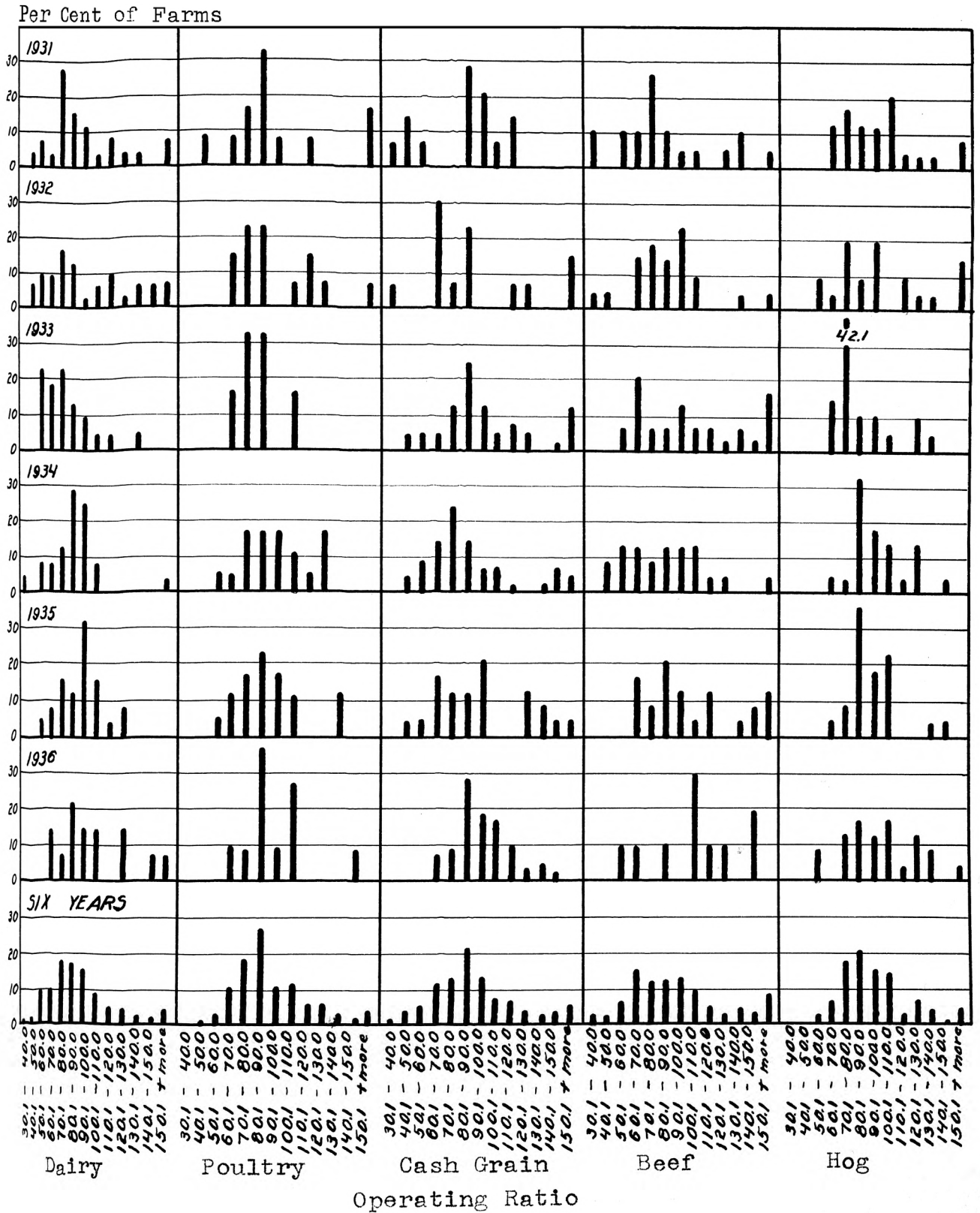


Fig. 9. Percentage distribution of the farms in the Northern Association according to the operating ratio by type of farming, 1931 to 1936.

Table XX. Modal Ranges of the Operating Ratios of Farms in the Northern Association by Type of Farming, 1931 to 1936.

| Type of Farming                              | 1931  | 1932                | 1933               | 1934   | 1935   | 1936    | Six years |
|--|-------|---------------------|--------------------|--------|--------|---------|-----------|
| Dairy and General Dairy                      | 70-80 | 70-80               | 70-80              | 80-90  | 90-100 | 80-90   | 70-80     |
| Poultry and General Poultry                  | 80-90 | 80-90 <sup>1</sup>  | 80-90 <sup>1</sup> | 80-90  | 80-90  | 80-90   | 80-90     |
| Cash Grain and General Crop                  | 80-90 | 60-70               | 80-90              | 70-80  | 90-100 | 80-90   | 80-90     |
| Livestock Specialty Beef<br>and General Beef | 70-80 | 90-100              | 60-70              | 90-100 | 80-90  | 100-110 | 60-70     |
| Livestock Specialty Hog<br>and General Hog   | 70-80 | 90-100 <sup>1</sup> | 70-80              | 80-90  | 80-90  | 80-90   | 80-90     |

<sup>1</sup>An equal per cent of the farms was in the range of 70 to 80. The distributions were positively skewed.



weighted average operating ratio for the hog farms was not within the modal range for any of the years. The modal range for the poultry, cash grain, and hog farms was 80 to 90, for the dairy farms 70 to 80, and for the beef farms 60 to 70.

In using the weighted averages and a 5 per cent rate of interest, the hog farms could carry a debt about equal to the income, beef farms a little more than two times the income, cash grain and dairy farms nearly 2.5 times the income, and poultry farms nearly 3.0 times the income. The debt-carrying capacity in relation to income would be somewhat higher than the above figures indicate if the modal ranges were used.

Variations in Operating Ratios. The coefficients of variation for each type for each year and for the six years are shown in Table XXI for the farm and living expenses in per cent of income and for the operating ratios. The six years of operating ratios for the dairy farms show the least variation, 37.5 per cent. Cash grain farms follow next with 39.4 per cent, beef farms 42.2 per cent, hog farms 45.7 per cent, and poultry farms 46.2 per cent. A few extreme cases in 1931 caused the coefficient of variation of the poultry farms to be extremely high for that year and, consequently, high for the six years. The other five years average a lower variation for the poultry farms than for the other



Table XXI. Dispersion of Farm and Expenses in Per Cent of Farm Income and Operating Ratios for the Farms in the Northern Association by Type of Farming, 1931 to 1936. (Coefficient of Variation)

| Type of Farming                              | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | Six<br>years |
|--|------|------|------|------|------|------|--------------|
| Farm Expenses in Per Cent of Income          |      |      |      |      |      |      |              |
| Dairy and General Dairy                      | 28.3 | 70.2 | 31.0 | 31.7 | 25.7 | 31.6 | 45.1         |
| Poultry and General Poultry                  | 91.7 | 32.7 | 9.3  | 24.7 | 29.3 | 16.7 | 47.8         |
| Cash Grain and General Crop                  | 42.7 | 46.3 | 67.1 | 36.2 | 37.3 | 21.4 | 48.5         |
| Livestock Specialty Beef<br>and General Beef | 51.6 | 29.4 | 52.2 | 53.8 | 32.9 | 34.8 | 48.0         |
| Livestock Specialty Hog<br>and General Hog   | 37.0 | 73.4 | 24.8 | 24.9 | 23.3 | 26.8 | 42.7         |
| Living Expenses in Per Cent of Income        |      |      |      |      |      |      |              |
| Dairy and General Dairy                      | 57.3 | 62.3 | 49.3 | 88.2 | 49.9 | 28.8 | 58.1         |
| Poultry and General Poultry                  | 72.5 | 38.9 | 35.7 | 42.4 | 54.8 | 68.2 | 67.2         |
| Cash Grain and General Crop                  | 44.7 | 69.1 | 43.0 | 51.8 | 38.0 | 46.1 | 48.5         |
| Livestock Specialty Beef<br>and General Beef | 76.3 | 53.0 | 82.8 | 51.8 | 68.3 | 49.6 | 76.7         |
| Livestock Specialty Hog<br>and General Hog   | 83.7 | 90.8 | 66.7 | 54.6 | 37.0 | 62.4 | 85.4         |
| Operating Ratio                              |      |      |      |      |      |      |              |
| Dairy and General Dairy                      | 34.2 | 55.2 | 23.0 | 26.5 | 18.6 | 28.2 | 37.5         |
| Poultry and General Poultry                  | 81.5 | 32.6 | 16.0 | 23.2 | 22.8 | 21.4 | 46.2         |
| Cash Grain and General Crop                  | 32.6 | 43.8 | 52.8 | 29.1 | 37.2 | 19.3 | 39.4         |
| Livestock Specialty Beef<br>and General Beef | 41.0 | 31.2 | 49.5 | 43.1 | 31.6 | 27.9 | 42.2         |
| Livestock Specialty Hog<br>and General Hog   | 45.0 | 74.5 | 24.9 | 21.2 | 20.2 | 25.5 | 45.7         |

types. Similarly a few extreme cases in 1932 for the hog farms caused the six year variation to be high. The coefficient of variation for the cash grain farms was much higher in 1933 than for the other years. There were from one to two rather extreme cases in nearly all the types for each year. The three abnormally high variation figures which have been mentioned were affected by a larger number of cases. Considering these extremes it might be concluded that the operating ratios varied least for the poultry farms, followed in order by the dairy farms, hog farms, cash grain farms, and the beef farms. Using the coefficients of variation as determined for the operating ratios for each type including all cases, the range in the operating ratios for the six years which would include approximately two-thirds of the cases was for dairy farms 57.1 to 125.7, poultry farms 51.4 to 139.4, cash grain farms 57.0 to 131.0, beef farms 55.9 to 137.7, and hog farms 55.0 to 147.6.

There are no great differences among the farms in the coefficients of variations for the six years for the farm expenses in per cent of income. The extreme cases mentioned above for the operating ratios originated largely in the farm expenses in per cent of income. There is a wide difference among the coefficients of variations for the living

expenses in per cent of income. From low to high in variation the types ranked cash grain, dairy, poultry, beef, and hog farms. The variation tended to decrease for each type throughout the period except for the poultry farms. The coefficient of variation for the living expenses on the poultry farms increased from 35.7 per cent in 1933 to 68.2 per cent in 1936.

DEBT CARRYING CAPACITY AS DETERMINED BY THE RELATIONSHIP  
BETWEEN THE RATIO OF DEBT TO INCOME AND THE NET  
CASH INCOME AFTER PAYING INTEREST

The second phase of the study consisted of, first, determining the total interest-bearing debt and its ratio to the income and the net cash income after paying interest; second, comparing the ratio of debt to income with the net cash income after paying interest. It would be expected that as the debt increased in relation to the income there would be a point reached when the net income after paying interest frequently would be zero or a minus figure. This should provide a check on the first phase of the study which determined in a theoretical manner the amount of debt that could be carried by the farm. Since the cost of carrying a debt is only one possible factor influencing the net cash income, a perfect relationship would not be

expected. A farm that had no debt, hence paid no interest, might show a minus net cash income because of unusual expenses such as the purchase of a large quantity of feed, the purchase of a large number of livestock, or the construction of a building. Also, crop failures or similar losses might result in the income being smaller than the expenses.

The amount of debt on a farm is one of the most difficult records to secure. Individuals frequently do not want others to know of their financial obligations. Many of the records which were sufficiently complete for the first phase of the study either did not show a debt but showed interest payments or showed a debt but no interest payments. There were extremely high and low interest rates paid for some which did show both debt and interest paid. It was necessary to calculate the rate of interest from the amount of the debt and the amount of interest paid. As stated under procedure, those records were used that showed no debt or interest payments and those that showed an interest payment within a range of 3.5 per cent to 8 per cent. The lower limit is the rate which has been charged by the Federal Land Bank since 1933. The upper limit is the rate frequently charged for notes and chattel mortgages as was shown on some of the records. A larger proportion of the farmers paid less than 3.5 per cent interest than over 8

per cent. Farmers frequently were unable to pay part or all of the interest during this period of years. The creditors often relinquished the interest obligations.

The number of farms, debt, income, expenses, and other data for the farms selected are shown in Table XXII. Because of the small number of cases, it was felt undesirable to classify the farms either by tenure or by type of farming. It was shown in the first phase of the study that the part-owned farms could carry the highest debt in relation to income, the owned farms second, and the rented farms the least. In determining this rank of the tenure groups, a 5 per cent interest rate was used for each group. A large part of the debt on owned farms consists of real estate loans on which the interest rate would be lower than that paid on chattel loans to farmers on rented farms. This fact should be given consideration in basing the amount of the various kinds of loans on the income of the farms. The cash available for interest should be capitalized at a higher rate for rented farms than for owned farms in determining the amount of debt that can be carried.

The average debt on these farms for the six-year period was highest in 1932 and amounted to \$7,170. The lowest average debt was \$4,963 in 1931. The average debt declined in 1933 and 1934 but advanced again in 1935 and 1936 to

Table XXII. Average Debt, Income, and Expenses of Farms in the Northern Association Including Farms with no Debt and Farms Paying a Rate of Interest from 3.5 to 8.0 Per Cent.

| Year    | Number of records | Total debt | Income | Farm and living expenses | Interest paid | Net income after paying interest | Ratio of debt to income | Interest in per cent of income | Operating ratio excluding interest | Rate of interest |
|---------|-------------------|------------|--------|--------------------------|---------------|----------------------------------|-------------------------|--------------------------------|------------------------------------|------------------|
| 1931    | 40                | 4,963      | 3,136  | 2,694                    | 263           | 179                              | 1.6                     | 8.4                            | 85.9                               | 5.30             |
| 1932    | 41                | 7,170      | 2,346  | 2,036                    | 371           | - 60                             | 3.1                     | 15.8                           | 89.9                               | 5.18             |
| 1933    | 46                | 5,606      | 2,592  | 2,434                    | 298           | - 139                            | 2.2                     | 11.5                           | 93.9                               | 5.31             |
| 1934    | 55                | 5,538      | 3,361  | 2,745                    | 266           | 349                              | 1.6                     | 7.9                            | 81.7                               | 4.80             |
| 1935    | 51                | 5,774      | 3,928  | 3,521                    | 290           | 118                              | 1.5                     | 7.4                            | 89.6                               | 5.02             |
| 1936    | 48                | 5,910      | 4,426  | 3,984                    | 274           | 168                              | 1.3                     | 6.2                            | 90.0                               | 4.64             |
| Average | 281               | 5,812      | 3,340  | 2,936                    | 292           | 112                              | 1.7                     | 8.7                            | 87.9                               | 5.01             |



\$5,910 in the latter year. The average debt for the six years was \$5,812. The average debt for the six years was 1.7 times the average income. The debt increased in relation to income from 1.6 in 1931 to 3.1 in 1932. It decreased in 1933 to 2.2, in 1934 to 1.6, in 1935 to 1.5, and in 1936 to 1.3. The increase in the income influenced this change more than the change in the debt.

The amount of interest paid averaged \$292 a year for the six years. The amount varied almost directly with the amount of debt. The interest paid in 1936 averaged slightly more than in 1935. The high interest payments in 1932 and 1933 account for part of the loss for those two years as is shown in Table XXII. With incomes low in 1932 and 1933, the proportion of the income required for interest payments in 1932 was 15.8 per cent and in 1933 was 11.5 per cent. The proportions required in the other years were 8.4 per cent in 1931, 7.9 per cent in 1934, 7.4 per cent in 1935, and 6.2 per cent in 1936.

The average operating ratio for the 281 farm records selected was 87.9 per cent. This is nearly two points under the average of the 642 farm records. It indicates that these farms could carry a little more debt in relation to income than could all the farms. For the individual years, the operating ratios were lower for the 281 selected

farms than for the total of 642 farms except for 1932 and 1933 when they were slightly higher. The average interest rate paid by the farms over the six years was 5 per cent. This figure corresponds to the rate used in the first phase of the study in determining the debt carrying ability in relation to income. There was a small variation from year to year in the average interest rate paid as is shown in Table XXII.

In examining the net cash income after paying interest, the debt carried in 1932 and 1933 exceeded the theoretical debt carrying capacity. This was possible by using surplus income of preceding years. Table XII in the first phase of the study shows the actual debt carried as exceeding the debt carrying capacity in 1933 and nearly so in 1932. The data are not exactly comparable as all the farms were used in the first phase and only selected farms in this phase of the study.

The farms were arrayed according to the ratio of debt to income for each year. The arrays were divided into nine groups and for each group there was determined the ratio of debt to income, the net cash income after paying interest, the interest paid in per cent of income, and the operating ratio excluding interest paid. The corresponding groups for the six years were combined and the same items calculated.



These data are shown in Table XXIII. This table shows the second group with a ratio of debt to income of 0.3 and a net income after paying interest of a minus \$122. This seems irregular, but, as stated previously, the debt is only one factor influencing the net income. It is quite possible to show a loss with no debt. The operating ratio excluding interest paid was 102.8 per cent for the farms in the second group. A small amount of interest paid, 1.6 per cent of the income, made the expenses further exceed the income. The proportion of the income required to pay the interest increased as the debt increased in relation to income. Those farms in the ninth group having a debt 5.1 times the income used 23.7 per cent, or nearly one-fourth of the income, to pay interest. It was not possible for the farms to keep the operating expenses sufficiently lower to use such a large proportion of the income for interest payment without showing a loss.

Except for group two the farms showed a substantial net income after paying interest up to group six. Group six, with an average debt 1.7 times the average income, showed a net income after paying interest of a minus \$19.00. Group seven with a debt ratio of 2.5 had \$125 net income. The net income for group eight was a minus \$278 with a debt ratio of 3.2. This indicates that some place between a

Table XXIII. Ratio of Debt to Income, Net Income, Interest in Per Cent of Income, and Operating Ratio in Northern Association<sup>1</sup>.  
(Six-year Group Average, 1931 to 1936)

| Group   | Ratio of<br>debt to<br>income | Net income<br>after paying<br>interest | Interest in<br>per cent of<br>income | Operating ratio<br>excluding<br>interest paid |
|---------|-------------------------------|--|--------------------------------------|---|
| 1       | 0.0                           | 305                                    | 0.0                                  | 90.7  |
| 2       | 0.3                           | -122                                   | 1.6                                  | 102.8   |
| 3       | 0.6                           | 415                                    | 3.4                                  | 84.7  |
| 4       | 1.0                           | 347                                    | 5.3                                  | 86.0  |
| 5       | 1.1                           | 426                                    | 5.8                                  | 78.4  |
| 6       | 1.7                           | -19                                    | 9.2                                  | 91.4  |
| 7       | 2.5                           | 125                                    | 12.3                                 | 84.1  |
| 8       | 3.2                           | -278                                   | 16.4                                 | 93.5  |
| 9       | 5.1                           | -123                                   | 23.7                                 | 80.1  |
| Average | 1.7                           | 112                                    | 8.7                                  | 87.9  |

<sup>1</sup>Six extreme cases not included due to the extreme change in inventory or other items.

debt 2.0 to 3.0 times the income a point was reached where the opportunity of carrying the debt from the farm income was small.

The ratio of debt to income and the net cash income after paying interest for the nine groups are plotted on figure 10 and the regression line calculated. There was a coefficient of correlation between the two of a minus 0.577. This shows a reasonably high relationship between the debt and net income. The regression line crossed the zero net cash income at a ratio of 2.97 or practically 3.0 which is slightly higher than the data in Table XXIII indicates it is safe to go. It coincides closely with the theoretical debt carrying capacity as determined by the modal range of the operating ratios.

Table XXIV shows the distribution of the net number of plus net incomes after paying interest according to the ratio of debt to income. For the six years it shows that beyond a debt ratio of 3.0 there is practically a 50-50 chance, and less as the ratio goes higher, of a surplus net income. Up to a ratio of 3.0 there is a much greater chance for a surplus net income.

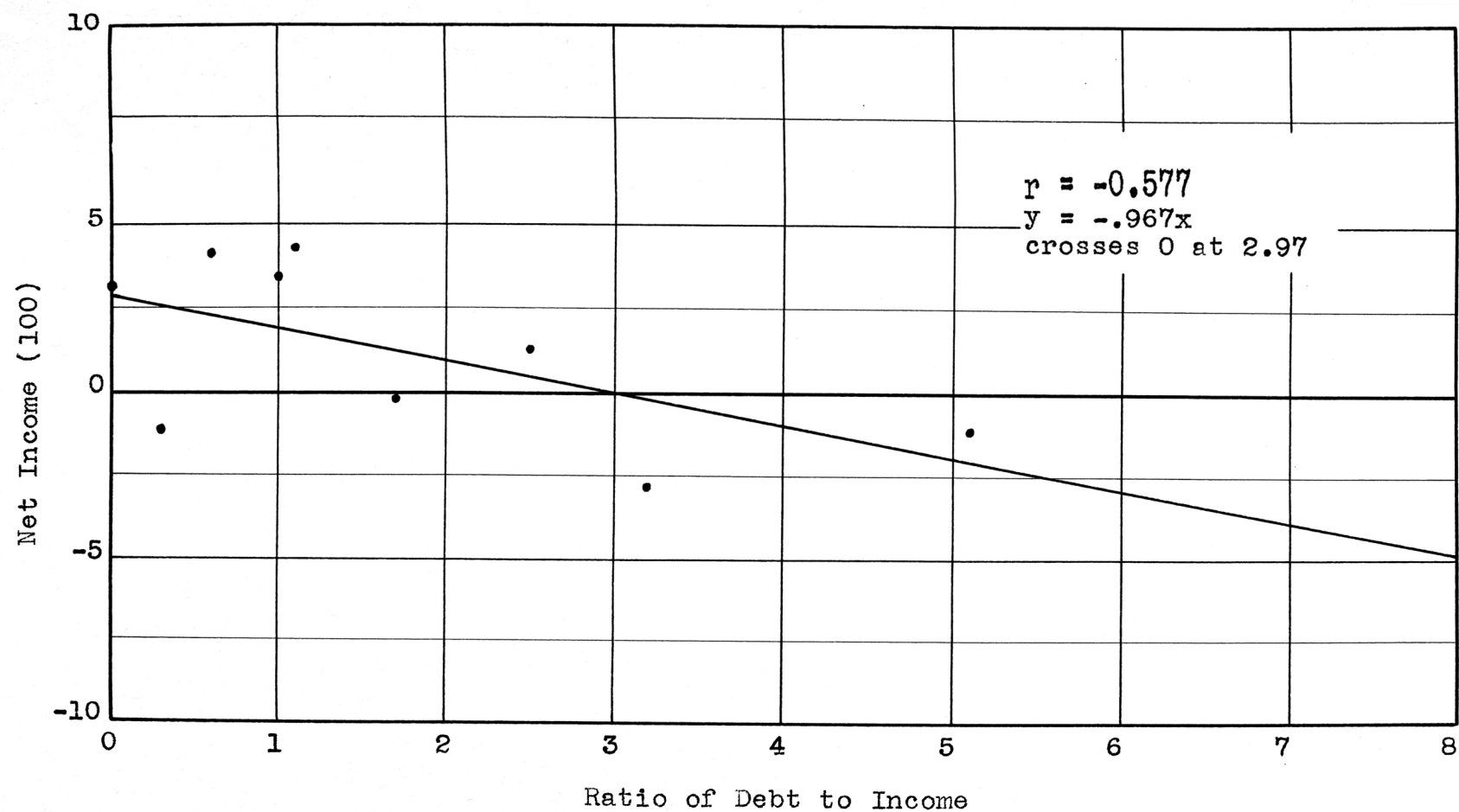


Fig. 10. Ratio of debt to income and net income after paying interest, six-year group averages, 1931 to 1936.

Table XXIV. Distribution of the Net Number of Farms in the Northern Association with Plus (or Minus) Net Income After Paying Interest According to the Ratio of Debt to Income, 1931 to 1936.

| Ratio of debt<br>to income | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | Six<br>years |
|----------------------------|------|------|------|------|------|------|--------------|
| 0.0                        | 0    | 0    | 2    | 3    | 5    | - 3  | 7            |
| 0.1 - 1.0                  | 3    | 0    | 3    | 11   | 6    | 2    | 25           |
| 1.1 - 2.0                  | 3    | 1    | - 2  | 2    | 1    | - 1  | 4            |
| 2.1 - 3.0                  | 5    | 0    | 1    | 2    | 2    | - 3  | 7            |
| 3.1 - 4.0                  | 0    | - 1  | 2    | 0    | - 1  | 1    | 1            |
| 4.1 - 5.0                  | - 1  | 4    | - 3  | 1    | 0    |      | 1            |
| 5.1 - 6.0                  |      | 0    | 1    | - 1  |      |      | 0            |
| 6.1 - 7.0                  |      | 1    |      |      |      |      | 1            |
| 7.1 and more               | - 2  | - 3  | - 2  |      |      | - 1  | - 8          |

### SUMMARY

Credit has become an important part of the farm business. There was an average debt of \$4,697 on 40.1 per cent of the farms in Kansas in 1935. With incomes greatly reduced during the last few years, the debt has been beyond the ability of the farmer to carry it in many cases. In other cases, the debt has reached the danger point.

Farm loans largely have been based upon an appraised value of the property. The creditor depends upon taking over the property if the borrower is unable to meet his obligation. The farmer expects to pay his obligations from the income of his business. While income has been a factor in determining the value of the farm hence, the amount of the loan, there has been no generally accepted appraisal system. As the debt increases in relation to the total income, it would be expected that the net income after paying interest would decrease.

Green (6) states that in the United States the farm expenses frequently are within the ranges of 60 to 69 per cent and 70 to 79 per cent of the income. He allowed approximately 15 per cent of the income for living expenses. In doing this there would be about 15 per cent margin of

the income to pay on the debt. At 5 per cent interest, this would carry a debt three times the income.

There were 642 farm records in east north central Kansas included in this study. This included the period of years from 1931 to 1936, inclusive. Of the total records, 253 were from owned farms, 221 from part-owned farms, and 168 from rented farms. In dividing the farms by type of farming, there were 140 dairy farms, 76 poultry farms, 173 cash-grain farms, 125 beef farms, and 128 hog farms.

The modal range of the association farms according to acres in farm was 260 to 499 in 1935. For the farms in the area the modal range was 100 to 174 acres.

Approximately the same proportion of the farms in the association were owned as for the area, but a larger proportion was part-owned and a smaller proportion rented.

Among association farms a larger proportion were dairy, livestock specialty, general, and poultry farms than was the case for the farms in the area. However, the area had a much larger proportion in cash grain farms and 8.7 per cent of the farms were of types not found among the association farms.

The income for the association farms declined relatively more than the cash income from farm marketing in Kansas in 1933, but advanced more following 1933. In 1935

and 1936 the farm expenses for association farms advanced relatively more than did the income.

The association farmers sold a larger proportion of their hogs during the high price seasons of the year than did all Kansas farmers.

The association farms have a larger per cent of their crop land in soil conserving crops than for all farms in the area.

Of the 25 identical farm records for the six years, the proportion of the farms rented increased in 1932 and 1933 and decreased after 1933. The dairy and poultry farms increased in importance in 1932. Hog farms generally declined in importance during the six years.

The period of years in which the farm records were kept, 1931 to 1936 inclusive, generally was a low crop and livestock production period, especially since 1934. Prices were at a lower level than since the beginning of the 20th century. The prices received by farmers advanced materially since 1932 for the United States. Prices paid by farmers also advanced but relatively less than income. There were two years, 1934 and 1936, of extremely low production and two years, 1932 and 1933, of extremely low prices included in the six years.

The average income for the farms for six years was



\$3,425. It was highest for part-owned and lowest for rented farms. The average farm expenses were 69.4 per cent of the income, least for owned and greatest for rented farms. Living expenses were greater for families on owned farms and least on rented farms. The average was \$692 or 20.2 per cent of the income for all farms. The operating ratio for all the farms was 89.6. It was 89.9 for owned farms, 87.5 for part-owned, and 92.6 for rented farms. The operating ratio tended to increase during the six years except 1934 when it was the lowest. The modal range of the operating ratios for each type of tenure and for all the farms was 80 to 90. The operating ratios varied slightly more for the owned farms than for part-owned and rented farms. There was a declining variation in the operating ratios throughout the period as shown by the coefficients of variation.

The income on beef farms was the largest, followed in order by hog, cash grain, poultry, and dairy farms. The farm expenses in per cent of income was highest for the hog farms, followed next by the beef and poultry farms, and then by the cash grain and dairy farms. The average operating ratios were for hog farms 95.3, beef 89.1, cash grain 88.2, dairy 87.6, and poultry 86.0. The modal range was 80 to 90 for poultry, cash grain, and hog farms; 70 to 80

for dairy farms; and 60 to 70 for beef farms. The distributions were positively skewed for the dairy, beef, and hog farms, especially for the beef farms.

There was an average interest-bearing debt of \$5,812 and average interest payment of 5 per cent on the debt, or \$292 for the 281 farms selected because they had a rather complete credit report. After paying all expenses including interest there was an average net income in 1932 of a minus \$60, and in 1933 of a minus \$139. As the ratio of debt to income increased the net income after paying interest tended to decrease and eventually became zero or less at a debt of approximately three times the income. When the debt exceeded three times the income there was a 50-50 chance or less that the net income after paying interest was a plus.

#### CONCLUSIONS

The farm records used in the study are for farms above the average farm in the area in which they are located. The association farms are larger in acreage, their income increased more rapidly, they marketed a larger proportion of the hogs during the high price months, and have a larger proportion of the crop land in soil conserving crops than for other farms in the same area and in Kansas.

The period of years in which the records were kept was an abnormally low commodity price period; however, prices advanced after the first two years. Production on the farms was below normal, especially after prices advanced. Expenses advanced relatively more than the income. Adjustment of the income and expenses to normal prices, production and costs would make the results of this study more useful. This would involve many difficult problems.

The average farm can carry a debt 2.1 times the income at a 5 per cent interest rate. The most frequent debt carrying capacity is 3.0 times the income. The average net cash income after paying interest will be zero when the debt reaches 3.0 times the income. The average owned farm can carry a debt 2.0 times the income, part-owned farm 2.5 times the income, and rented farm 1.5 times the income. On the basis of the most frequent debt carrying capacity these figures can be raised from one-half to one point.

The average hog farms can carry a debt about equal to the income, beef farms 2.2, cash grain 2.3, dairy 2.5, and poultry 2.8 times the income. On the basis of the most frequent debt carrying capacity these figures can be raised from one-half to one point.

The average operating ratio became more reliable in recent years as was shown by a declining coefficient of

variation throughout the period, from 1931 to 1936, inclusive.

The debt carrying capacity in relation to income of other farms would be less than is shown for the farms used in this study. In a period of nearer normal prices, both received and paid, and production the debt could be higher than the above figures.

A 5 per cent interest rate was used for this study. If the debt service, interest and principal, is higher than 5 per cent, the debt carrying ability would be less.

The farmer's chances of paying the debt, without sacrifice of his property, becomes small when the debt exceeds three times the annual income.

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APPENDIX



Table XXV. Production of Selected Crops and Numbers of Selected Livestock in Type<sup>1</sup> of Farming Area 6a in Kansas and Index of Prices Received and Paid by Farmers in the United States, 1910 to 1936.

| Year | Production (1000 Bu.) |        | Numbers (1,000) |              |      |       | Index of prices received | Index of prices paid |
|------|-----------------------|--------|-----------------|--------------|------|-------|--------------------------|----------------------|
|      | Wheat                 | Corn   | Milk cows       | Other cattle | Hogs | Hens  |                          |                      |
| 1910 | 3,337                 | 17,759 | 52              | 173          | 133  |       | 102                      | 98                   |
| 1911 | 7,743                 | 9,649  | 64              | 159          | 180  |       | 95                       | 101                  |
| 1912 | 8,642                 | 11,731 | 74              | 140          | 142  |       | 100                      | 100                  |
| 1913 | 10,444                | 194    | 69              | 138          | 120  |       | 101                      | 101                  |
| 1914 | 16,154                | 5,102  | 65              | 111          | 98   |       | 101                      | 100                  |
| 1915 | 9,040                 | 13,778 | 74              | 150          | 119  |       | 98                       | 105                  |
| 1916 | 7,465                 | 5,094  | 79              | 173          | 115  |       | 118                      | 124                  |
| 1917 | 4,260                 | 10,122 | 44              | 181          | 104  |       | 175                      | 149                  |
| 1918 | 8,164                 | 2,377  | 53              | 180          | 122  |       | 202                      | 176                  |
| 1919 | 11,128                | 3,765  | 53              | 176          | 105  |       | 213                      | 202                  |
| 1920 | 12,085                | 10,213 | 45              | 148          | 82   |       | 211                      | 201                  |
| 1921 | 10,965                | 5,780  | 46              | 155          | 86   |       | 125                      | 152                  |
| 1922 | 12,780                | 6,298  | 46              | 150          | 105  |       | 132                      | 149                  |
| 1923 | 10,549                | 8,134  | 45              | 164          | 152  |       | 142                      | 152                  |
| 1924 | 13,153                | 7,416  | 40              | 178          | 135  |       | 143                      | 152                  |
| 1925 | 4,808                 | 6,451  | 47              | 169          | 101  | 1,577 | 156                      | 157                  |
| 1926 | 11,037                | 2,656  | 49              | 147          | 79   | 1,575 | 145                      | 155                  |
| 1927 | 16,237                | 11,276 | 47              | 127          | 89   | 1,647 | 139                      | 153                  |
| 1928 | 15,065                | 13,555 | 47              | 146          | 108  | 1,611 | 149                      | 155                  |
| 1929 | 9,194                 | 8,698  | 48              | 153          | 120  | 1,517 | 146                      | 153                  |
| 1930 | 13,338                | 4,347  | 47              | 169          | 109  | 1,603 | 126                      | 145                  |
| 1931 | 16,054                | 4,907  | 51              | 171          | 98   | 1,449 | 87                       | 124                  |
| 1932 | 11,051                | 10,525 | 44              | 189          | 143  | 1,362 | 65                       | 107                  |
| 1933 | 9,694                 | 4,683  | 46              | 192          | 148  | 1,440 | 70                       | 109                  |
| 1934 | 7,083                 | 328    | 53              | 226          | 119  | 1,498 | 90                       | 123                  |
| 1935 | 8,040                 | 1,684  | 65              | 114          | 44   | 1,157 | 108                      | 125                  |
| 1936 | 13,220                | 690    | 42              | 174          | 45   | 1,076 | 114                      | 124                  |

<sup>1</sup>Production and numbers secured from reports of Kansas State Board of Agriculture and Indexes of prices received and paid by farmers from The Agricultural Situations, Bureau of Agricultural Economics, United States Department of Agriculture.

Table XXVI. Average Income and Expenses for the Farms in the Northern Association by Tenure, 1931 to 1936.

| Year | Tenure     | Number<br>of farm<br>records | Income | Farm Expenses |                       | Living Expenses |                       | Operating<br>ratio |
|------|------------|------------------------------|--------|---------------|-----------------------|-----------------|-----------------------|--------------------|
|      |            |                              |        | Amount        | Per cent<br>of income | Amount          | Per cent<br>of income |                    |
| 1931 | Owned      | 42                           | 3,813  | 2,077         | 54.4                  | 1,077           | 28.2                  | 82.6               |
|      | Part-owned | 33                           | 3,247  | 2,044         | 63.0                  | 847             | 26.1                  | 89.1               |
|      | Rented     | 18                           | 2,459  | 1,552         | 63.1                  | 762             | 31.0                  | 94.1               |
|      | All farms  | 93                           | 3,350  | 1,964         | 58.6                  | 934             | 27.9                  | 86.5               |
| 1932 | Owned      | 38                           | 2,236  | 1,407         | 62.9                  | 725             | 32.4                  | 95.3               |
|      | Part-owned | 38                           | 2,760  | 1,682         | 60.9                  | 551             | 19.9                  | 80.8               |
|      | Rented     | 21                           | 2,281  | 1,470         | 64.3                  | 583             | 25.5                  | 89.8               |
|      | All farms  | 97                           | 2,451  | 1,528         | 62.3                  | 626             | 25.5                  | 87.8               |
| 1933 | Owned      | 48                           | 2,312  | 1,445         | 63.6                  | 605             | 26.2                  | 89.8               |
|      | Part-owned | 34                           | 2,501  | 1,846         | 73.8                  | 472             | 18.9                  | 92.7               |
|      | Rented     | 33                           | 2,156  | 1,670         | 77.5                  | 486             | 22.6                  | 100.1              |
|      | All farms  | 115                          | 2,323  | 1,628         | 70.1                  | 532             | 22.9                  | 93.0               |
| 1934 | Owned      | 44                           | 3,444  | 2,113         | 61.3                  | 710             | 20.6                  | 81.9               |
|      | Part-owned | 46                           | 3,940  | 2,521         | 64.0                  | 716             | 18.2                  | 82.2               |
|      | Rented     | 35                           | 2,844  | 1,956         | 68.8                  | 538             | 18.9                  | 87.7               |
|      | All farms  | 125                          | 3,459  | 2,219         | 64.2                  | 664             | 19.2                  | 83.4               |
| 1935 | Owned      | 40                           | 3,930  | 3,043         | 77.4                  | 654             | 16.6                  | 94.0               |
|      | Part-owned | 42                           | 5,190  | 4,068         | 78.3                  | 717             | 13.8                  | 92.1               |
|      | Rented     | 30                           | 3,724  | 2,578         | 69.2                  | 654             | 17.5                  | 86.7               |
|      | All farms  | 112                          | 4,345  | 3,303         | 75.9                  | 678             | 15.5                  | 91.4               |
| 1936 | Owned      | 41                           | 4,424  | 3,516         | 79.4                  | 808             | 18.3                  | 97.7               |
|      | Part-owned | 28                           | 6,289  | 4,725         | 75.2                  | 789             | 12.6                  | 87.8               |
|      | Rented     | 31                           | 3,405  | 2,686         | 78.9                  | 690             | 20.3                  | 99.2               |
|      | All farms  | 100                          | 4,630  | 3,597         | 77.7                  | 766             | 16.5                  | 94.2               |

Table XXVII. Percentage Distribution of Owned Farms in the Northern Association According to the Operating Ratio, 1931 to 1936.

| Operating Ratio | 1931  | 1932  | 1933  | 1934  | 1935  | 1936  | Six<br>years |
|-----------------|-------|-------|-------|-------|-------|-------|--------------|
| 30.1 to 40.0    | 4.8   | 2.6   |       | 2.3   |       |       | 1.6          |
| 40.1 to 50.0    | 2.4   | 5.3   | 4.2   | 4.5   |       |       | 2.8          |
| 50.1 to 60.0    | 4.8   | 5.3   | 6.2   | 6.8   |       |       | 4.0          |
| 60.1 to 70.0    | 14.3  | 10.5  | 14.6  | 13.6  | 15.0  | 4.9   | 12.2         |
| 70.1 to 80.0    | 16.6  | 10.5  | 27.1  | 13.6  | 10.0  | 12.2  | 15.4         |
| 80.1 to 90.0    | 21.3  | 10.5  | 16.7  | 22.8  | 17.5  | 26.8  | 19.4         |
| 90.1 to 100.0   | 9.5   | 18.5  | 4.2   | 9.2   | 27.5  | 12.2  | 13.0         |
| 100.1 to 110.0  | 11.9  | 5.3   | 6.2   | 6.8   | 12.5  | 19.5  | 10.3         |
| 110.1 to 120.0  | 2.4   | 5.3   | 2.1   | 4.5   | 2.5   | 4.9   | 3.6          |
| 120.1 to 130.0  | 2.4   | 7.9   |       | 9.1   |       | 7.3   | 4.3          |
| 130.1 to 140.0  | 4.8   | 2.6   | 2.1   |       | 5.0   | 4.9   | 3.2          |
| 140.1 to 150.0  |       | 2.6   | 4.2   | 6.8   | 7.5   | 4.9   | 4.3          |
| 150.1 and more  | 4.8   | 13.1  | 12.4  |       | 2.5   | 2.4   | 5.9          |
| Total           | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0        |

Table XXVIII. Percentage Distribution of Part-owned Farms in the Northern Association According to the Operating Ratio, 1931 to 1936.

| Operating Ratio | 1931  | 1932  | 1933  | 1934  | 1935  | 1936  | Six<br>years |
|-----------------|-------|-------|-------|-------|-------|-------|--------------|
| 30.1 to 40.0    | 3.0   |       |       |       |       |       | 0.4          |
| 40.1 to 50.0    | 6.1   | 2.6   |       | 4.3   |       |       | 2.3          |
| 50.1 to 60.0    | 9.1   | 7.9   | 11.8  | 6.5   | 4.8   | 10.7  | 8.1          |
| 60.1 to 70.0    | 3.0   | 18.4  | 11.8  | 8.7   | 9.5   | 14.3  | 10.8         |
| 70.1 to 80.0    | 15.1  | 21.1  | 14.7  | 13.0  | 11.9  | 10.7  | 14.5         |
| 80.1 to 90.0    | 18.2  | 15.8  | 17.5  | 21.8  | 23.8  | 10.7  | 18.6         |
| 90.1 to 100.0   | 12.1  | 7.9   | 11.8  | 21.8  | 21.4  | 25.0  | 16.8         |
| 100.1 to 110.0  | 6.1   | 5.3   | 5.9   | 15.2  | 7.1   | 21.4  | 10.0         |
| 110.1 to 120.0  | 9.1   | 10.5  | 11.8  | 4.3   | 4.8   |       | 6.8          |
| 120.1 to 130.0  | 6.1   | 2.6   | 5.9   | 2.2   | 2.4   | 3.6   | 3.6          |
| 130.1 to 140.0  |       | 7.9   | 5.9   |       | 7.1   |       | 3.6          |
| 140.1 to 150.0  |       |       |       |       | 2.4   |       | 0.4          |
| 150.1 and more  | 12.1  |       | 2.9   | 2.2   | 4.8   | 3.6   | 4.1          |
| Total           | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0        |

Table XXIX. Percentage Distribution of Rented Farms in the Northern Association According to the Operating Ratio, 1931 to 1936.

| Operating Ratio | 1931  | 1932             | 1933  | 1934  | 1935  | 1936  | Six<br>years     |
|-----------------|-------|------------------|-------|-------|-------|-------|------------------|
| 30.1 to 40.0    |       | 4.8 <sup>1</sup> |       |       |       |       | 0.6 <sup>1</sup> |
| 40.1 to 50.0    | 5.5   |                  |       |       | 3.3   |       | 1.2              |
| 50.1 to 60.0    |       |                  | 6.1   | 11.4  | 3.3   |       | 4.2              |
| 60.1 to 70.0    |       | 9.5              | 15.2  | 8.6   | 10.0  | 3.2   | 8.3              |
| 70.1 to 80.0    | 33.4  | 19.0             | 12.1  | 20.0  | 13.4  | 3.2   | 15.5             |
| 80.1 to 90.0    | 11.1  | 23.8             | 15.2  | 17.2  | 20.0  | 35.6  | 20.8             |
| 90.1 to 100.0   | 16.8  | 4.8              | 21.1  | 14.3  | 13.3  | 6.4   | 13.1             |
| 100.1 to 110.0  | 5.5   | 4.8              | 6.1   | 8.6   | 13.4  | 12.9  | 8.9              |
| 110.1 to 120.0  | 11.1  | 9.5              | 3.0   |       | 3.3   | 12.9  | 6.0              |
| 120.1 to 130.0  |       |                  | 9.1   | 5.7   | 13.4  | 9.7   | 7.1              |
| 130.1 to 140.0  | 11.1  |                  | 3.0   | 2.8   | 3.3   | 6.4   | 4.2              |
| 140.1 to 150.0  |       | 4.8              |       | 2.8   |       | 9.7   | 3.0              |
| 150.1 and more  | 5.5   | 19.0             | 9.1   | 8.6   | 3.3   |       | 7.1              |
| Total           | 100.0 | 100.0            | 100.0 | 100.0 | 100.0 | 100.0 | 100.0            |

<sup>1</sup>Includes a 25.5 Operating Ratio.

Table XXX. Percentage Distribution of Farms in the Northern Association According to the Farm Expenses in Per Cent of Income by Year and by Tenure.

[illegible]



Table XXXI. Percentage Distribution of Farms in the Northern Association According to the Living Expenses in Per Cent of Income by Year and by Tenure.

[illegible]

Table XXXII. Average Income and Expenses for the Farms in the Northern Association for 1931 by Type of Farming.

| Type of Farming                           | Number of farm records | Income | Farm Expenses |                    | Living Expenses |                    | Operating ratio |
|---|------------------------|--------|---------------|--------------------|-----------------|--------------------|-----------------|
|   |                        |        | Amount        | Per cent of income | Amount          | Per cent of income |                 |
| Dairy and General Dairy                   | 25                     | 2,733  | 1,590         | 58.1               | 843             | 30.8               | 88.9            |
| Poultry and General Poultry               | 12                     | 2,335  | 1,336         | 57.2               | 670             | 28.7               | 85.9            |
| Cash Grain and General Crop               | 14                     | 2,661  | 1,371         | 51.5               | 692             | 25.9               | 77.4            |
| Livestock Specialty Beef and General Beef | 19                     | 5,112  | 2,853         | 55.8               | 1,320           | 25.8               | 81.6            |
| Livestock Specialty Hog and General Hog   | 23                     | 3,510  | 2,325         | 66.2               | 1,000           | 28.5               | 94.7            |



Table XXXIII. Average Income and Expenses for the Farms in the Northern Association for 1932 by Type of Farming.

| Type of Farming                           | Number of farm records | Income | Farm Expenses |                    | Living Expenses |                    | Operating ratio |
|---|------------------------|--------|---------------|--------------------|-----------------|--------------------|-----------------|
|   |                        |        | Amount        | Per cent of income | Amount          | Per cent of income |                 |
| Dairy and General Dairy                   | 30                     | 2,136  | 1,302         | 60.9               | 515             | 24.1               | 85.0            |
| Poultry and General Poultry               | 13                     | 1,675  | 935           | 55.8               | 490             | 29.3               | 85.1            |
| Cash Grain and General Crop               | 13                     | 2,089  | 1,385         | 66.3               | 553             | 26.5               | 92.8            |
| Livestock Specialty Beef and General Beef | 21                     | 4,069  | 2,281         | 56.0               | 952             | 23.4               | 79.4            |
| Livestock Specialty Hog and General Hog   | 20                     | 1,966  | 1,554         | 79.1               | 585             | 29.8               | 108.9           |

Table XXXIV. Average Income and Expenses for the Farms in the Northern Association in 1933 by Type of Farming.

| Type of Farming                           | Number of farm records | Income | Farm Expenses |                    | Living Expenses |                    | Operating ratio |
|---|------------------------|--------|---------------|--------------------|-----------------|--------------------|-----------------|
|   |                        |        | Amount        | Per cent of income | Amount          | Per cent of income |                 |
| Dairy and General Dairy                   | 22                     | 2,165  | 1,210         | 55.9               | 422             | 19.5               | 75.4            |
| Poultry and General Poultry               | 6                      | 2,608  | 1,446         | 55.4               | 580             | 22.3               | 77.7            |
| Cash Grain and General Crop               | 39                     | 2,031  | 1,483         | 73.0               | 508             | 25.0               | 98.0            |
| Livestock Specialty Beef and General Beef | 29                     | 2,589  | 2,075         | 80.1               | 565             | 21.8               | 101.9           |
| Livestock Specialty Hog and General Hog   | 19                     | 2,797  | 1,723         | 61.5               | 642             | 22.9               | 84.4            |

Table XXXV. Average Income and Expenses for the Farms in the Northern Association in 1934 by Type of Farming.

| Type of Farming                           | Number of farm records | Income | Farm Expenses |                    | Living Expenses |                    | Operating ratio |
|---|------------------------|--------|---------------|--------------------|-----------------|--------------------|-----------------|
|   |                        |        | Amount        | Per cent of income | Amount          | Per cent of income |                 |
| Dairy and General Dairy                   | 24                     | 2,977  | 1,959         | 65.8               | 674             | 22.6               | 88.4            |
| Poultry and General Poultry               | 17                     | 2,673  | 1,853         | 69.3               | 501             | 18.7               | 88.0            |
| Cash Grain and General Crop               | 41                     | 3,430  | 2,026         | 59.5               | 679             | 19.8               | 79.3            |
| Livestock Specialty Beef and General Beef | 22                     | 4,759  | 2,906         | 61.1               | 757             | 15.9               | 77.0            |
| Livestock Specialty Hog and General Hog   | 21                     | 3,339  | 2,512         | 75.2               | 681             | 20.4               | 95.6            |

Table XXXVI. Average Income and Expenses for the Farms in the Northern Association in 1935 by Type of Farming.

| Type of Farming                           | Number of farm records | Income | Farm Expenses |                    | Living Expenses |                    | Operating ratio |
|---|------------------------|--------|---------------|--------------------|-----------------|--------------------|-----------------|
|   |                        |        | Amount        | Per cent of income | Amount          | Per cent of income |                 |
| Dairy and General Dairy                   | 25                     | 3,539  | 2,581         | 72.9               | 607             | 17.2               | 90.1            |
| Poultry and General Poultry               | 17                     | 3,751  | 2,728         | 72.7               | 511             | 13.6               | 86.3            |
| Cash Grain and General Crop               | 24                     | 3,513  | 2,505         | 71.3               | 688             | 19.6               | 90.9            |
| Livestock Specialty Beef and General Beef | 24                     | 6,589  | 5,334         | 81.0               | 879             | 13.3               | 94.3            |
| Livestock Specialty Hog and General Hog   | 22                     | 4,054  | 3,224         | 79.5               | 655             | 16.2               | 95.7            |

Table XXXVII. Average Income and Expenses for the Farms in the Northern Association in 1936 by Type of Farming.

| Type of Farming                           | Number of farm records | Income | Farm Expenses |                    | Living Expenses |                    | Operating ratio |
|---|------------------------|--------|---------------|--------------------|-----------------|--------------------|-----------------|
|   |                        |        | Amount        | Per cent of income | Amount          | Per cent of income |                 |
| Dairy and General Dairy                   | 14                     | 4,096  | 3,269         | 79.8               | 601             | 14.7               | 94.5            |
| Poultry and General Poultry               | 11                     | 4,030  | 2,852         | 70.6               | 658             | 16.3               | 87.0            |
| Cash Grain and General Crop               | 42                     | 3,549  | 2,475         | 69.7               | 801             | 22.6               | 92.3            |
| Livestock Specialty Beef and General Beef | 10                     | 8,086  | 7,413         | 91.6               | 855             | 10.6               | 102.2           |
| Livestock Specialty Hog and General Hog   | 23                     | 5,723  | 4,634         | 80.9               | 838             | 14.6               | 95.5            |

Table XXXVIII. Percentage Distribution of the Dairy and General Dairy Farms in the Northern Association According to the Operating Ratio, 1931 to 1936.

| Operating Ratio | 1931  | 1932  | 1933  | 1934  | 1935  | 1936  | Six years |
|-----------------|-------|-------|-------|-------|-------|-------|-----------|
| 30.1 to 40.0    |       |       |       | 4.2   |       |       | 0.7       |
| 40.1 to 50.0    | 4.0   | 6.7   |       |       |       |       | 2.1       |
| 50.1 to 60.0    | 8.0   | 10.0  | 22.8  | 8.3   | 4.0   |       | 9.3       |
| 60.1 to 70.0    | 4.0   | 10.0  | 18.2  | 8.3   | 8.0   | 14.3  | 10.0      |
| 70.1 to 80.0    | 28.0  | 16.6  | 22.8  | 12.5  | 16.0  | 7.1   | 17.9      |
| 80.1 to 90.0    | 16.0  | 13.3  | 13.6  | 29.2  | 12.0  | 21.5  | 17.1      |
| 90.1 to 100.0   | 12.0  | 3.3   | 9.1   | 25.0  | 32.0  | 14.3  | 15.7      |
| 100.1 to 110.0  | 4.0   | 6.7   | 4.5   | 8.3   | 16.0  | 14.3  | 8.6       |
| 110.1 to 120.0  | 8.0   | 10.0  | 4.5   |       | 4.0   |       | 5.0       |
| 120.1 to 130.0  | 4.0   | 3.3   |       |       | 8.0   | 14.3  | 4.3       |
| 130.1 to 140.0  | 4.0   | 6.7   | 4.5   |       |       |       | 2.9       |
| 140.1 to 150.0  |       | 6.7   |       |       |       | 7.1   | 2.1       |
| 150.1 and more  | 8.0   | 6.7   |       | 4.2   |       | 7.1   | 4.3       |
| Total           | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0     |

Table XXXIX. Percentage Distribution of the Poultry and General Poultry Farms in the Northern Association According to the Operating Ratio, 1931 to 1936.

| Operating Ratio | 1931  | 1932  | 1933  | 1934  | 1935  | 1936  | Six years |
|-----------------|-------|-------|-------|-------|-------|-------|-----------|
| 30.1 to 40.0    |       |       |       |       |       |       | 1.3       |
| 40.1 to 50.0    | 8.3   |       |       |       |       |       | 2.6       |
| 50.1 to 60.0    |       |       |       | 5.9   | 5.9   |       | 10.5      |
| 60.1 to 70.0    | 8.3   | 15.4  | 16.7  | 5.9   | 11.8  | 9.1   | 18.5      |
| 70.1 to 80.0    | 16.8  | 23.1  | 33.3  | 17.6  | 17.6  | 9.1   | 26.4      |
| 80.1 to 90.0    | 33.3  | 23.1  | 33.3  | 17.7  | 23.5  | 36.3  | 10.5      |
| 90.1 to 100.0   | 8.3   |       |       | 17.6  | 17.6  | 9.1   | 11.8      |
| 100.1 to 110.0  |       | 7.7   | 16.7  | 11.8  | 11.8  | 27.3  | 5.3       |
| 110.1 to 120.0  | 8.3   | 15.3  |       | 5.9   |       |       | 5.3       |
| 120.1 to 130.0  |       | 7.7   |       | 17.6  |       |       | 2.6       |
| 130.1 to 140.0  |       |       |       |       | 11.8  |       | 1.3       |
| 140.1 to 150.0  |       |       |       |       |       | 9.1   | 3.9       |
| 150.1 and more  | 16.7  | 7.7   |       |       |       |       |           |
| Total           | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0     |

Table XL. Percentage Distribution of the Cash Grain and General Crop Farms in the Northern Association According to the Operating Ratio, 1931 to 1936.

| Operating Ratio | 1931  | 1932  | 1933  | 1934  | 1935  | 1936  | Six<br>years |
|-----------------|-------|-------|-------|-------|-------|-------|--------------|
| 30.1 to 40.0    | 7.1   | 7.7   |       |       |       |       | 1.2          |
| 40.1 to 50.0    | 14.3  |       | 5.1   | 4.9   | 4.2   |       | 4.0          |
| 50.1 to 60.0    | 7.1   |       | 5.1   | 9.8   | 4.2   |       | 4.6          |
| 60.1 to 70.0    |       | 30.7  | 5.1   | 14.6  | 16.7  | 7.1   | 11.0         |
| 70.1 to 80.0    |       | 7.7   | 12.8  | 24.5  | 12.5  | 9.5   | 13.3         |
| 80.1 to 90.0    | 28.7  | 23.1  | 25.8  | 14.6  | 12.5  | 28.6  | 21.9         |
| 90.1 to 100.0   | 21.4  |       | 12.8  | 7.3   | 20.7  | 19.0  | 13.8         |
| 100.1 to 110.0  | 7.1   |       | 5.1   | 7.3   |       | 16.7  | 7.5          |
| 110.1 to 120.0  | 14.3  | 7.7   | 7.7   | 2.4   |       | 9.5   | 6.4          |
| 120.1 to 130.0  |       | 7.7   | 5.1   |       | 12.5  | 2.4   | 4.0          |
| 130.1 to 140.0  |       |       |       | 2.4   | 8.3   | 4.8   | 3.0          |
| 140.1 to 150.0  |       |       | 2.6   | 7.3   | 4.2   | 2.4   | 3.5          |
| 150.1 and more  |       | 15.4  | 12.8  | 4.9   | 4.2   |       | 5.8          |
| Total           | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0        |



Table XLI. Percentage Distribution of the Beef and General Beef Farms in the Northern Association According to the Operating Ratio, 1931 to 1936.

| Operating Ratio | 1931  | 1932             | 1933  | 1934  | 1935  | 1936  | Six years        |
|-----------------|-------|------------------|-------|-------|-------|-------|------------------|
| 30.1 to 40.0    | 10.5  | 4.8 <sup>1</sup> |       |       |       |       | 2.4 <sup>1</sup> |
| 40.1 to 50.0    |       | 4.8              |       | 9.1   |       |       | 2.4              |
| 50.1 to 60.0    | 10.5  |                  | 6.9   | 13.6  |       | 10.0  | 6.4              |
| 60.1 to 70.0    | 10.5  | 14.3             | 20.8  | 13.6  | 16.7  | 10.0  | 15.2             |
| 70.1 to 80.0    | 26.3  | 19.0             | 6.9   | 9.1   | 8.3   |       | 12.0             |
| 80.1 to 90.0    | 10.5  | 14.3             | 6.9   | 13.7  | 20.8  | 10.0  | 12.8             |
| 90.1 to 100.0   | 5.3   | 23.7             | 13.8  | 13.7  | 12.5  |       | 12.8             |
| 100.1 to 110.0  | 5.3   | 9.5              | 6.9   | 13.7  | 4.2   | 30.0  | 9.6              |
| 110.1 to 120.0  |       |                  | 6.9   | 4.5   | 12.5  | 10.0  | 5.6              |
| 120.1 to 130.0  | 5.3   |                  | 3.4   | 4.5   |       | 10.0  | 3.2              |
| 130.1 to 140.0  | 10.5  | 4.8              | 6.9   |       | 4.2   |       | 4.8              |
| 140.1 to 150.0  |       |                  | 3.4   |       | 8.3   | 20.0  | 4.0              |
| 150.1 and more  | 5.3   | 4.8              | 17.2  | 4.5   | 12.5  |       | 8.8              |
| Total           | 100.0 | 100.0            | 100.0 | 100.0 | 100.0 | 100.0 | 100.0            |

<sup>1</sup>Includes a 25.5 Operating Ratio.

Table XLII. Percentage Distribution of the Hog and General Hog Farms in the Northern Association According to the Operating Ratio, 1931 to 1936.

| Operating Ratio | 1931  | 1932  | 1933  | 1934  | 1935  | 1936  | Six<br>years |
|-----------------|-------|-------|-------|-------|-------|-------|--------------|
| 30.1 to 40.0    |       |       |       |       |       |       |              |
| 40.1 to 50.0    |       |       |       |       |       |       |              |
| 50.1 to 60.0    |       | 10.0  |       |       |       | 8.7   | 3.1          |
| 60.1 to 70.0    | 13.1  | 5.0   | 15.8  | 4.8   | 4.5   |       | 7.0          |
| 70.1 to 80.0    | 17.4  | 20.0  | 42.1  | 4.8   | 9.1   | 13.0  | 17.2         |
| 80.1 to 90.0    | 13.1  | 10.0  | 10.5  | 33.2  | 36.5  | 17.5  | 20.3         |
| 90.1 to 100.0   | 13.1  | 20.0  | 10.5  | 19.0  | 18.2  | 13.0  | 15.6         |
| 100.1 to 110.0  | 21.7  |       | 5.3   | 14.3  | 22.7  | 17.5  | 14.1         |
| 110.1 to 120.0  | 4.3   | 10.0  |       | 4.8   |       | 4.3   | 3.9          |
| 120.1 to 130.0  | 4.3   | 5.0   | 10.5  | 14.3  |       | 13.0  | 7.8          |
| 130.1 to 140.0  | 4.3   | 5.0   | 5.3   |       | 4.5   | 8.7   | 4.7          |
| 140.1 to 150.0  |       |       |       | 4.8   | 4.5   |       | 1.6          |
| 150.1 and more  | 8.7   | 15.0  |       |       |       | 4.3   | 4.7          |
| Total           | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0        |